

ON A COLLECTION OF UPOGEBIIDAE (CRUSTACEA, THALASSINIDEA) FROM THE NORTHERN TERRITORY MUSEUM, AUSTRALIA, WITH THE DESCRIPTION OF TWO NEW SPECIES.

K. SAKAI

Laboratory of Crustacea, Shikoku University,
771-11 Tokushima, Japan.

ABSTRACT

Ten species of the decapod crustacean family Upogebiidae, *Upogebia darwinii*, *U. bowerbankii*, *U. ancylodactyla*, *U. tractabilis*, *U. carinicauda*, *Gebiacantha priochela* sp. n., *Neogebicula fallax*, *Acutigebia kyphosoma* sp. n., and *Wolffogebia inermis* are reported from northern Australia, and one species, *U. wulshienweni*, from Hong Kong. The holotypes of *Gebiacantha acutispina* and *G. niugini* were re-examined in the course of comparison with *G. priochela*. *Upogebia hexaceras* and *U. octoceras* are again synonymized with *U. darwinii*. *Upogebia balmaorum* and *U. laemanu* from the Seychelles are synonymized with *U. tractabilis*. The subgenus *Acutigebia* Sakai, 1982, and the subgenus *Neogebicula* Sakai, 1982, are elevated to generic level. The genus *Wolffogebia* is discussed.

KEYWORDS: Crustacea, Decapoda, Thalassinidea, Upogebiidae, *Acutigebia*, *Gebiacantha*, *Neogebicula*, *Upogebia*, *Wolffogebia*, new taxa, northern Australia, Hong Kong.

INTRODUCTION

In 1979, Poore and Griffin summarized the information on Australian upogebiids (Crustacea, Decapoda, Thalassinidea), and recorded 11 species: *Upogebia australiensis* de Man, 1927; *U. bowerbankii* (Miers, 1884); *U. carinicauda* (Stimpson, 1860); *U. darwinii* (Miers, 1884); *U. dromana* Poore and Griffin, 1979; *U. giralia* Poore and Griffin, 1979; *U. hexaceras* (Ortmann, 1894); *U. neglecta* de Man, 1927; *U. sinsouii* (Thomson, 1893); *U. spinifrons* (Haswell, 1882); and *U. tractabilis* (Hale, 1941). Poore (1982) described *U. niugini* from the seas north of Australia. This species has been synonymized with *G. acutispina* (de Saint Laurent and Ngoc-Ho, 1979) by Ngoc-Ho (1989). Sakai (1984b) described *Acutigebia trypeta* (Sakai, 1970) from Heron Island, Queensland, and added another new species, *Wolffogebia obtifrons* Sakai, 1982, from north-western Australia.

This report deals with ten species from Australia, including two new species: *Upogebia darwinii* (= *U. hexaceras*, -*U. octoceras* Nobili,

1904), *U. bowerbankii* (= *U. australiensis*); *U. ancylodactyla* De Man, 1905; *U. tractabilis* (= *U. balmaorum* Ngoc-Ho, 1990, and *U. laemanu* Ngoc-Ho, 1990); *U. carinicauda*; *Neogebicula fallax* de Man, 1905; *Gebiacantha acutispina* (= *U. niugini* Poore, 1982); *G. priochela* sp. n.; *Acutigebia kyphosoma* sp. n. and *Wolffogebia inermis* Sakai, 1982; and one species from Hong Kong, *U. wulshienweni* Yu, 1931. *Upogebia tractabilis* (Hale, 1941) has been recorded from Gulf St Vincent, South Australia, to Rottneest Island, Western Australia (Poore and Griffin, 1979: 309), from Madagascar (Sakai, 1982: 16), as well as from the North West Shelf of Australia (this paper) and the Seychelles (Ngoc-Ho, 1990:966). The presence of *U. carinicauda* in Australia is confirmed. In all, 17 upogebiid species are now known from Australia.

The following abbreviations are used in this paper; TL, total length in millimetres measured by attaching a thread from the tip of the rostrum to the end of the telson; CL, length of carapace; R, length of rostrum; BMNH, Natural History Museum, London; BLT, Biological Laboratory,

Shikoku University, Tokushima; NMV, Museum of Victoria, Melbourne; NTM, Northern Territory Museum, Darwin; RMNH, Nationaal Natuurhistorisch Museum, Leiden; SMF, Senckenberg Museum, Frankfurt am Main; USNM, National Museum of Natural History, Washington, D.C.

Family Upogebiidae Borradaile, 1903

Upogebiinae, Borradaile, 1903:542.

Type genus: *Upogebia* Leach, 1814.

Genus *Upogebia* Leach

Upogebia Leach, 1814:400.

Upogebia - Sakai, 1982:8.

Type species. *Cancer (Astacns) stellatus* Montague, 1808, by monotypy.

Extended Diagnosis. Usually gonochoristic. Rostrum broadly or narrowly triangular, rounded or obtuse apically; ventral margin with or without teeth. Anterior portion of carapace including rostrum flattened dorsally, armed with teeth and setae; lateral crest distinctly produced anteriorly or reduced, flanked on each side by furrow. Anterolateral margin of carapace with or without teeth. Cervical groove well-marked, with or without posterior marginal teeth. Linea thalassinica extending continuously or discontinuously length of posterior carapace, or absent. Abdomen depressed, segment 6 usually rectangular, pleura little developed. Telson usually broader than long or quadrate in form, with sides parallel or converging posteriorly.

Eycstalk subglobose. Maxilliped 1 epipod absent or reduced. Maxilliped 2 with exopod. Maxilliped 3 ischium with crista dentata usually absent or faintly marked, and merus unarmed on mesial margin; exopod present. Pereopod 1 symmetrical, chelate or subchelate. Percopods 2-4 simple and pereopod 5 simple or subchelate. Pleopod 1 absent in male and biarticulate in female. Pleopods 2-5 biramous, broadly or narrowly foliaceous, without appendix internae; pleopod 2 in male without appendix masculina. Uropod narrow or broad, exopod without suture.

Remarks. Upogebiid species are usually gonochoristic. However, *U. wuhsienweni* Yu, 1931, from China and Taiwan, and *U. narutensis* Sakai, 1986, from Japan, are hermaphroditic, having a genital pore on the coxa of pereopod 3 in both sexes.

Upogebia darwinii (Miers, 1884)

Gebiopsis darwinii Miers, 1884:281 (partim), pl. 32, fig. A.

Gebia (Gebiopsis) hexaceras Ortman, 1894:23, pl. 3, fig. 1.

Upogebia (Gebiopsis) octoceras Nobili, 1904:236.

Upogebia (Calliadue) darwinii - Poore and Griffin, 1979:292 (partim, fig. 46 = *U. carinicauda*).

Upogebia (Upogebia) darwinii - Sakai, 1982:17, 105, figs 3a, 4a-c, pls A1-3, C3.

Upogebia hexaceras - Ngoc-Ho, 1990:979, fig. 8.

Upogebia octoceras - Ngoc-Ho, 1990:982, fig. 9.

Upogebia darwinii - Ngoc-Ho, 1990:984.

Material. NTM Cr.000094, one female, TL 45.0, Bynoe Harbour, NT, 12°42'S, 130°34'E, 2-3 m, 30 October 1981, coll. P. Byers, FV *Skelton* trawl. NTM Cr.000128, one male, TL 25.0; 3 females, TL 18.0-16.0, Dudley Point, Darwin, NT, 11 December 1981, coll. P. Horner, in intertidal sponge. NTM Cr.000466, one male, TL 27.0; one male, TL 28.0, North Shell Island, Darwin, NT, AJB/13, 23 June 1983, host: *Petrosia* sp. (det. J.N.A. Hooper), coll. P. Horner. NTM Cr.000513, 2 males, TL 28.0-27.0; 2 ovig. females, TL 33.0-29.0; 4 females, TL 35.0-32.0, North West Shelf, WA, 19°52'S 117°32'E, 29 May 1983, 70-80 m. coll. L. Bullard, trawl. NTM Cr.000776, one male, TL 27.0; one ovig. female, TL 31.0, off Table Head, Port Essington, NT, 11°14.7'S 132°10'E, CP/46, 12 May 1983, 5 m, coll. N.L. Bruce. NTM Cr.000777, one male, TL 17.0; one ovig. female, TL 30.0, Table Head, Port Essington, NT, 11°14.8'S 132°10.8'E, CP/44, 11 May 1983, coll. N.L. Bruce. NTM Cr.000794, one male, TL 28.0; one ovig. female, TL 37.0, New Year Island, Cobourg Peninsula, NT, NY/2, 14 October 1982, 10 m, coll. A.J. Bruce. NTM Cr.000797, one male, TL 12.0, Dudley Point, Darwin, NT, 11 December 1981, coll. P. Horner, intertidal reef flat, sponge. NTM Cr.000798, one male, TL 23.0, Lee Point, Darwin, NT, LP-1, coll. J.R. Hanley. NTM Cr.000800, one male, TL; 30.0, one ovig. female, TL 29.0, Channel Island, Darwin Harbour, NT, 20 August 1982, 11 m, coll. P. Horner, from sponge. NTM Cr.000836, one male, TL 32.0; one ovig. female, TL 33.0, Barracuda Reef, Gove, NT, 12°14.4'S 136°41.4'E, 27 September 1976, coll. NT Fisheries Dept. NTM Cr.000837.

2 males, TL 29.0-27.0; 2 ovig. females, TL 32.0-25.0; 2 females, TL 26.0-25.0, Coral Bay, Port Essington, NT, 11°10.8'S 132°03.1'E, 6 m, CP/11, 19 July 1981, coll. J.N.A. Hooper. NTM Cr.000844, one male, TL 28.0; 2 ovig. females, TL 31.0-26.0, Coral Bay, Port Essington, NT, 11°11.2'S 132°03.1'E, OP/6, 23 June 1981, 3 m, coll. J.N.A. Hooper, in sponge. NTM Cr.000869, 8 males, TL 31.0-19.0; 10 ovig. females, TL 36.0-27.0, North West Shelf, WA, 19°20.2'S 115°44.1'E, NSW-34, 29 January 1984, 308-306 m, trawl, coll. A.J. Bruce. NTM Cr.000920, one male, TL 22.0, Lee Point, Darwin, NT, 13 December 1981, intertidal, coll. J.N.A. Hooper.

Diagnosis. Rostrum broad or narrow, with 4-10 (usually six to eight) marginal spines. Linea thalassinica extending half length of posterior portion of carapace posterior to cervical groove. Telson broader than long. Pereopod 1 chelate, ventral meral spines usually present, distomesial and distolateral margin of propod usually without spines; mesial surface of dactyl with 5-15 granules on longitudinal median carina; cutting edge of fixed finger with row of spiniform or rounded denticles. Lateral expansion of abdominal somite 6 usually obtuse, and posterior margin usually denticulate.

Remarks. Ngoc-Ho (1990:984) considered *U. darwinii* to be a distinct species from *U. octoceras* and *U. hexaceras*, without mentioning its relationship to *U. australiensis* and *U. bowerbankii*. She re-defined *U. hexaceras* and *U. octoceras* as valid species by the following characters: (1) number of rostral spines; (2) states of lateral expansion of abdominal somite 6; (3) armature on the posterior border of abdominal segment 6; (4) form of telson; (5) armature on the ventral margin of cheliped merus; (6) armature of distomesial spine on cheliped propodus near articulation with the dactylus; and (7) teeth on the cutting edge of fixed finger. However, examination of the present specimens confirmed that *U. darwinii*, *U. octoceras* and *U. hexaceras* are conspecific, because the characters adopted by Ngoc-Ho have intermediate forms and individual variations as shown in the following examples.

In four specimens, -one female (NTM Cr.000094), one male (NTM Cr.000798), one male and one ovig. female (NTM Cr.000794), the lateral expansion of abdominal somite 6 is obtuse; the telson is broader than long, the distomesial spine of the cheliped propod is absent as in *U. darwinii* and *U. octoceras*. How-

ever, in the female (NTM Cr.000094), there are six rostral spines, the teeth on the fixed finger are rounded, and the posterior margin of abdominal somite 6 is smooth as in *U. octoceras*. In the male (NTM Cr.000798), there are four rostral spines, the posterior margin of abdominal somite 6 is finely denticulate; and the teeth on the fixed finger are triangular as in *U. darwinii*. In the male and the ovigerous female (NTM Cr.000794), there are four rostral spines, the posterior margin of abdominal somite 6 is smooth as in *U. darwinii*, and the teeth on the fixed finger are either triangular (male), as in *U. darwinii*, or rounded (female), as in *U. octoceras*.

Most of the specimens examined have the lateral expansion of abdominal somite 6 produced into an obtuse or a pointed triangle, as in *U. hexaceras*. However, in three male and female specimens (NTM Cr.000513), the teeth on the fixed finger are rounded in shape, as in *U. octoceras*, while in the other female they are denticulate, as in *U. hexaceras* or *U. darwinii*. In two male specimens (NTM Cr.000466), the teeth on the fixed finger are rounded as in *U. octoceras*, while in the female these are triangular, as in *U. hexaceras*. In three females (NTM Cr.000128), the teeth on the fixed finger are rounded as in *U. octoceras*, while in the remaining male these are triangular, as in *U. darwinii* or *U. hexaceras*.

In two specimens, (NTM Cr.00076), one male and one ovigerous female, the lateral expansion of abdominal somite 6 is triangular, as in *U. hexaceras*, the telson is broader than long, as in *U. darwinii* and *U. octoceras*, while in the male there are six rostral spines, and the distomesial spine of the propod is short, as in *U. octoceras*. In the ovigerous female there are four rostral spines, and the distomesial spine of the propod is absent, as in *U. darwinii*. In the other two specimens (NTM Cr.000800), one male and one ovigerous female, there are four rostral spines and the telson is broader than long, as in *U. darwinii*. However, in the male, the distomesial margin of the propod is armed with a short spine as in *U. octoceras*, while in the ovigerous female, it is unarmed as in *U. darwinii*.

Distribution. Northern Territory (Darwin (type locality)); Western Australia (Dampier Archipelago); Western Australia (Cottesloe); Queensland (Cape York); Torres Strait (Thursday Island (type locality of *U. hexaceras*)); Indonesia (*Siboga* Stn 164, Bangka Strait); Philippines (*Albatross* Stn 5141, 617a); South China Sea; Thailand (Phuket); western Sumatra; Gulf

of Oman; Gulf of Aden (Aden, Obock and Perim (type locality of *U. octoceras*)); Kenya; Zanzibar.

Upogebia bowerbankii (Miers, 1884)

Gebialhirtifrons Haswell, 1882:164 (non *Gebia hirtifrons*, White, 1847).

Gebiopsis bowerbankii Miers, 1884:282.

Upogebia octoceras australiensis de Man, 1927:14-17.

Upogebia (Calliadne) australiensis - Poore and Griffin, 1979:287.

Upogebia (Calliadne) bowerbankii - Poore and Griffin, 1979:289, figs 44-45.

Upogebia (Upogebia) bowerbankii - Sakai, 1982:24, figs 3b-c, 4d-g.

Material. NTM Cr.000778, one juv., TL 11.0, Caiman Creek, Port Essington, NT, 11°13.9'S 132°12.3'E CP/58, 15 May 1983, 0.5 m, coll. N.L. Bruce. NTM Cr.000787, one female, TL 32.0, North West Shelf, WA, 20°15.9'S 116°25.6'E, T/24/61, 11 April 1983, 42 m, coll. P. Blythe, trawl, FRV *Soela*, CSIRO 0283.

Diagnosis. Rostrum rounded on anterior margin, with 8-14 marginal spines. Dorsal surface of anterior portion of carapace setose, with scattered spines. Linea thalassinica extending half length of posterior portion of carapace posterior to cervical groove. Telson quadrate. Pereopod 1 chelate, distomesial margin of propod with one sharp spine, distolateral margin of propod with one to two sharp spines; mesial surface of dactyl with median row of prominent denticles.

Remarks: This species is difficult to separate from *U. darwinii* by such characters as the number of rostral spines, the triangular lateral expansion of abdominal somite 6, and the denticulation of pereopod 1, especially that of the fixed finger. However, the square telson and the distolateral and distomesial spines of the propod of pereopod 1 are characteristic in *U. bowerbankii*. Two specimens examined show some intermediate forms and variations as follows: the larger specimen (NTM Cr.000787) has 10 rostral spines, the telson is about as long as wide, the cutting edge of the fixed finger has five larger, obtuse, roughly-arranged teeth, the distolateral margin of propod has two small spines and the distomesial margin has one spine. In the other specimen (NTM Cr.000778) there are six rostral spines, the cutting edge of the fixed finger is minutely denticulate, the distolateral margin of the propod has two spines and the

mesiolateral margin of the propod has one spine.

Distribution. Queensland (Port Molle); New South Wales (Broughton Island, Avalon, Collaroy, Balmoral Beach, Port Jackson (type locality of *U. australiensis*), Bondi Beach); South Australia (Backstairs Passage, Spencer Gulf); Western Australia (Fremantle (type locality), Cottesloe, Lancelin Island, North West Shelf); Northern Territory (Port Essington). Port Essington and the North West Shelf are the most northerly records of *U. bowerbankii*.

Upogebia ancylocactyla de Man, 1905

Upogebia (Gebiopsis) ancylocactyla de Man, 1905:599.

Upogebia ancylocactyla - Tirmizi and Kazmi, 1979:106, fig. 1.

Upogebia (Upogebia) ancylocactyla - Sakai, 1982:27, 105, figs 3e, 5c.

Material. NTM Cr.000779, one female, TL 12.0, Coral Bay, Port Essington, NT, 11°11.0'S 132°03.4'E, 6 m, 16 May 1983, CP/60, coll. N.L. Bruce. NTM Cr.000831, one female, TL 22.0, Black Point, Port Essington, NT, 11°09.0'S 132°08.5'E, CP/30, 10-12 m, 29 April 1982, coll. H. Larson and P. Horner. NTM Cr.000835, one male, TL 35.0; one female, TL 32.0, Table Head, Port Essington, NT, 11°13.5'S 132°11.5'E, 2-4 m, CP/38, 4 May 1982, coll. H. Larson and P. Horner. NTM Cr.000868, 2 females, TL 20.0-21.0, Black Point, Port Essington, NT, 11°09.0'S 132°08.5'E, CP/30, 10-12 m, 29 April 1982, coll. H. Larson and P. Horner.

Diagnosis. Four rostral spines. Dorsal surface of anterior carapace portion setose, with two to four spines anteriorly. Linea thalassinica extending half length of posterior portion of carapace posterior to cervical groove on posterior portion of carapace. Telson broader than long, transverse part of U-shaped ridge denticulate. Pereopod 1 chelate, distolateral and distoventral carpal spines present, distomesial spine of propod small, distolateral spine of propod absent, dactyl thick, short, incurved distally, mesial surface with smooth median carina, cutting edge of fixed finger denticulate proximally. Posterior margin of abdominal somite 6 smooth.

Remarks: The present examination reveals some variation in the species: there are four rostral spines, the posterior margin of abdominal somite 6 is smooth, the antennular peduncle reaches the middle of the distal segment of the antenna, the dactyl of pereopod 1 is distally

deflexed, the cutting edge of the fixed finger is convex, with denticles in male (NTM Cr.000835) and females (NTM Cr.000831, Cr.000868), however, in the larger female (NTM Cr.000835) they are smooth, without denticles. In the small female specimen (NTM Cr.000779), there are four rostral spines, no denticles on the posterior margin of abdominal somite 6 as described above for the larger specimens, however, the cutting edge of the fixed finger of pereopod 1 is not convex, but slightly concave, with denticles.

Distribution. Northern Territory (Port Essington); Indonesia (Smau Island near Timor (type locality)); Singapore; Philippines (Luzon). Port Essington is the southernmost record of this species.

Upogebia tractabilis (Hale, 1941)

Calliadne tractabilis Hale, 1941:276, text-fig. 11.

Upogebia (*Calliadne*) *tractabilis* - Poore and Griffin, 1979:307, text-fig. 55.

Upogebia (*Upogebia*) *tractabilis* - Sakai, 1982:16, text-figs 1e, 2c-e.

Upogebia balmaorum Ngoc-Ho, 1990:966, text-figs 1-2.

Upogebia laemanu Ngoc-Ho, 1990:969, text-figs 2-3.

Upogebia tractabilis - Ngoc-Ho, 1990:971.

Material. NTM Cr.000789, 8 males, TL 16, CL 4.5 - TL 34.0, CL 7.0; 4 ovig. females, TL 37.0, CL 7.5 - TL 33, CL 6.5, North West Shelf, WA, 19°50.8'S 116°34.6'E, 57 m, 10 April 1983, coll. P. Blythe.

Diagnosis. Rostrum triangular, with distinct median groove, and with four to six lateral spines. No linea thalassinica on carapace posterior to cervical groove. Telson broader than long. Ventral spine on antennular article 1 absent. Pereopod 1 chelate, with 8-13 ventral spines on merus in female, 5-15 in male, distoventral carpal spine usually absent, small distodorsal carpal spine present, cutting edge of fixed finger finely denticulate proximally, and with rounded proximal tooth, cutting edge of dactyl with two to six triangular teeth medially, and dorsal margin of dactyl usually smooth. Uropodal exopod with conspicuous proximal spine.

Remarks. The present specimens, which include males and females, are identified as *U. tractabilis* on the base of the spinulation and shape of the rostrum, the lateral crest of the carapace, and the morphology of pereopod 1 and

uropodal exopod. However, some characters overlap those of two similar species, *U. balmaorum* Ngoc-Ho, 1990, and *U. laemanu* Ngoc-Ho, 1990 from the Seychelles.

The Australian specimens have a median groove on the rostrum, four to six spines on the lateral margin of the rostrum, a small dorsal carpal spine on pereopod 1, the cutting edge of the dactyl is armed with two to six teeth, and declines toward the tip, a proximal spine on the uropodal exopod is present as in *U. tractabilis*, but the ventral spine on the antennular article 1 is absent, the dorsal margin of the dactyl of pereopod 1 is usually smooth as in *U. laemanu*, but in two male specimens it has a few tubercles proximally as in *U. tractabilis*, and the ventral meral margin has 5-15 spines, the ventral carpal spine is usually absent but in two males there are one to two spines as in *U. balmaorum*, and the telson is broader than long as in *U. balmaorum* and *U. laemanu*, and not quadrate, as in *U. tractabilis*.

Thus, with reference to the present specimens, *U. balmaorum* and *U. laemanu* are not clearly distinguishable from *U. tractabilis*, so I prefer to treat Ngoc-Ho's two Seychelle species as synonyms of *U. tractabilis*.

Distribution. Known from South Australia (Gulf St Vincent (type locality), Spencer Gulf) to Western Australia (Bunbury, Cottesloe, Rottnest Island) and further to the North West Shelf; Seychelles (type localities of *U. balmaorum* and *U. laemanu*) and Madagascar. The North West Shelf is the northernmost record of the species in Australia. Often associated with sponges.

Upogebia carinicauda (Stimpson, 1860)

Gebia carinicauda Stimpson, 1860:23.

Upogebia (*Upogebia*) *carinicauda* - de Man, 1928:60, pls 3-4; Poore and Griffin, 1979:292; Sakai, 1982:35.

Material. NTM Cr.000781, one female, TL 39.0, reef off Mangrove Point, Port Essington, NT, 11°23.6'S 132°10.5'E, 14 May 1983, CP/53, coll. A.J. Bruce. NTM Cr.000791, one female, TL 35.0, King and Micket's Creek, Darwin, NT, D-12/55, 8-9 November 1972, coll. NT Fisheries Dept. NTM Cr.000793, one male, TL 16.0, one female, TL 18.5, Dudley Point Reef, Darwin, NT, 19 September 1981, AJB-3, coll. A.J. Bruce. NTM Cr.000795, one male, TL 13.0, attacked by *Peregrinamor* sp. on thorax, Dudley Point, Darwin, NT, 12°25.0'S 130°49.1'E, AJB-

2, 1 September 1981, coll. A.J. Bruce. NTM Cr.000801, one female, TL 33.0, Lee Point, Darwin, NT, shore reef flat, 7 September 1975, coll. A.J. Dartnall. NTM Cr.00832, 2 males, TL 10.0; 2 females, TL 15.0, 16.0, Bullocky Point, Darwin, NT, AJB/10, 3 December 1982, coll. A.J. Bruce. NTM Cr.000834, 3 males, TL 16.0, 19.0, 29.0; 4 females, TL 14.0, 15.0, 18.0, 19.0, Dudley Point Reef, Darwin, NT, AJB/6, 20 September 1982, coll. A.J. Bruce and P. Horner. NTM Cr.000838, one female, TL 19.0, Lee Point, Darwin, NT, 12°19.5'S, 130°52.5'E, AJB/8, 23 September 1982, coll. A.J. Bruce. NTM Cr.000840, one ovig. female, TL 38.0, Barracuda Reef, Gove, NT, 12°14.4'S 136°41.4'E, 27 September 1976, coll. NT Fisheries Department. NTM Cr.00841, 2 males, TL 15.0, 19.0, Dudley Point, Darwin, NT, AJB/5, 19 September 1982, coll. A.J. Bruce. NTM Cr.000843, one male, TL 17.0; one female, TL 30.0, East Point, Darwin, NT, reef flat, AJB/11, 1 January 1983, coll. A.J. Bruce.

Diagnosis. Rostrum with four subterminal spines, ventral surface unarmed. Linea thalassinica discontinuous, upper line halfway to cervical groove posteriorly, and ventral line anterior to posterior margin of carapace. Anterolateral margin of carapace with single spine. Telson broader than long; transverse part of U-shaped ridge sharply elevated. Pereopod 1 subchelate, four to five sharp meral spines ventrally on proximal half, sharp dorsal meral subterminal spine, two sharp distomesial carpal spines dorsally, two small distolateral carpal spines dorsally, and sharp distoventral carpal spine; chela distorted, dorsal margin of propod smooth to denticulate, with triangular spine proximally, ventral margin with sharp spine at base of fixed finger, fixed finger short, with four to five teeth at cutting edge, dactyl granulate on cutting edge, with longitudinal row of 13-16 granules on mesial surface.

Remarks. There is little variation in this species. Usually there are four rostral spines, but five in two female specimens (NTM Cr.000801, Cr.000843).

Distribution. Hong Kong (type locality); South China Sea; Tong King; Vietnam (Ho Chi Minh City); Philippines (Luzon); Samoa; Papua New Guinea (Buka, New Britain); Torres Strait; Northern Territory (Cape Arnhem, Darwin); Indonesia (Sawu, Ambon); Sri Lanka; India (Bombay); Madagascar (Nossi Bé).

Upogebia wuhsienweni Yu, 1931
(Figs 1-2)

Upogebia wuhsienweni Yu, 1931:86.

Upogebia (Upogebia) wuhsienweni - Sakai, 1982:59.

Material. NTM Cr.003934a, one male, TL 35.0, CL (including rostrum) 1.0; NTM Cr.003932b, one female, TL 44.0, CL 11.0; NTM Cr.003932c, one female, TL 39.0, CL 10.2, Sai Kung, Hong Kong, 13 April, 1986. 2°22.8'N 114°16.2'E, coll. P. Hutchings and F. Wells. NTM Cr.003932d, 3 males, TL 19.0-21.0, CL 5.0-5.5, Sai Kung, Hong Kong, 13 April 1986, 22°22.8'N 114°16.2'E, coll. P. Hutchings and F. Wells. NTM Cr.003928, 2 males, TL 33.0-37.0, CL 10.5-11.5, Starfish Bay, Hong Kong, 22°26.8'N 114°14.6'E, 12 April 1986, coll. R. Gibson. NTM Cr.008504, one male, TL 20.0, CL 5.0; one female, TL 42.0, CL 12.2, rostral tip broken, Mirs Bay, Hong Kong, 8 April 1986. NTM Cr.003983, one male, TL 48.0, CL 14.0, moulted specimen, Mirs Bay, Hong Kong, 17 April 1986.

Diagnosis. Hermaphroditic. Rostrum triangular, hirsute, with three to six lateral spines, three to five ventral spines. Lateral crest of carapace with one to five ventral spines. Anterolateral margin of carapace with three to six spines. No linea thalassinica on posterior portion of carapace. Cervical groove serrate posteriorly. Telson broader than long. Pereopod 1 subchelate. In male, seven to nine ventral meral spines, dorsal meral margin with one subterminal spine; distodorsal margin of carpus with two distinct spines, distoventral carpal spine sharp, and ventrolateral margin with row of four spines; chela distorted; dorsal margin of propod spinulate with 9-11 spines, fixed finger strong, arising far from distoventral angle, mesial surface with crescent-shaped ridge distally. In female, lateral carpal surface without ventral row of spines, mesial surface of propod without crescent-shaped ridge distally; fixed finger arising from distoventral angle. In male, genital pores open on coxae of pereopods 3 and 5, pleopod absent; in female, on coxa of pereopod 3, pleopod 1 uniramous, two-segmented.

Description of male. Anterior region of carapace 1.7 times length of posterior region. Cervical groove entire, with row of denticles laterally anterior to crossing point of linea thalassinica, posteriorly unarmed (Fig. 1A). Rostrum obtuse distally, dorsal surface setose, with four small

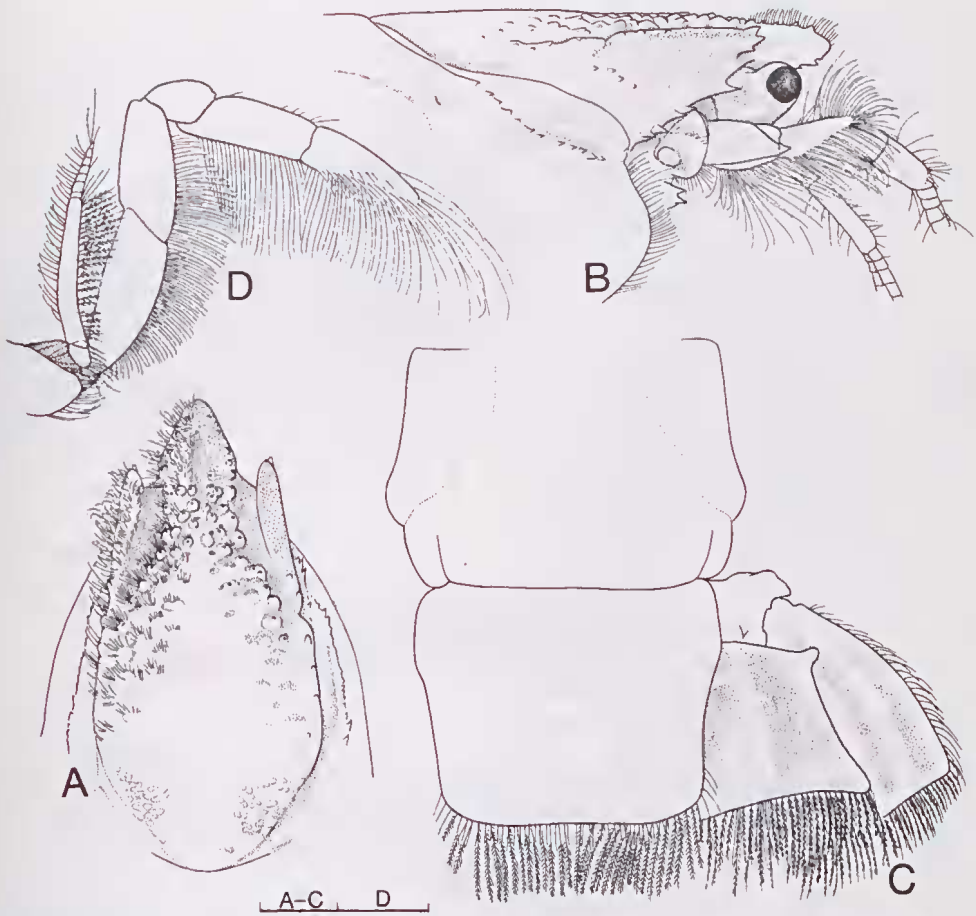


Fig. 1. *Upogebia wuhsienweni* Yu, 1931. A-B, anterior region of carapace, dorsal and lateral views; C, tail-fan, dorsal view. D, maxilliped 3, lateral view. A-D, male, NTM Cr.0003932a. Scale in 1 mm divisions.

marginal spines, medially concave, ventral surface with two small, sharp spines (Fig. 1B). Posterior to rostrum, dorsal region of carapace with row of rounded spines laterally, almost smooth medially. Lateral crest flanked on each side by deep furrow, setose, with few spines; small sharp spine anteriorly, and one to two blunt spines at posterior part. Anterolateral margin with five distinct spines, with additional spine below tip of lateral crest. Anterolateral surface with six denticles. Epistome tip with two spines.

Relative lengths of abdominal somites 1-6 and telson 1; 1.1; 0.8; 0.8; 0.8; 1 and 1. Telson (Fig. 1C) 1.3 times wider than long; lateral margins slightly expanded proximally, converging posteriorly to rounded posterolateral angle; posterior margin convex.

Antennular peduncle unarmed, failing to reach distal margin of antennal peduncle; flagella short, about as long as antennular peduncle. Antennal

peduncle unarmed; scaphocerite rounded distally.

Maxilliped 3 (Fig. 1D) unarmed; exopod consisting of proximal segment and segmented flagellum, reaching to level equal to midpoint of carpus.

Percopod 1 subchelate. Coxa unarmed. Basis with obtuse proximal protuberance on ventral margin. Ischium with two spines on ventral margin. Merus (Fig. 2A) 2.3 times as long as wide; dorsal margin with stout subterminal spine; ventral surface with row of eight sharp spines laterally. Carpus more than half length of merus; dorsal margin with row of four denticles; ventrolateral carina with three spines; distomesial margin dorsally with two sharp spines (Fig. 2B), distoventral angle with sharp spine. Propod more than twice as long as wide, 1.8 times length of carpus; dorsal margin with row of 10 short triangular spines; lateral surface with dorsal,

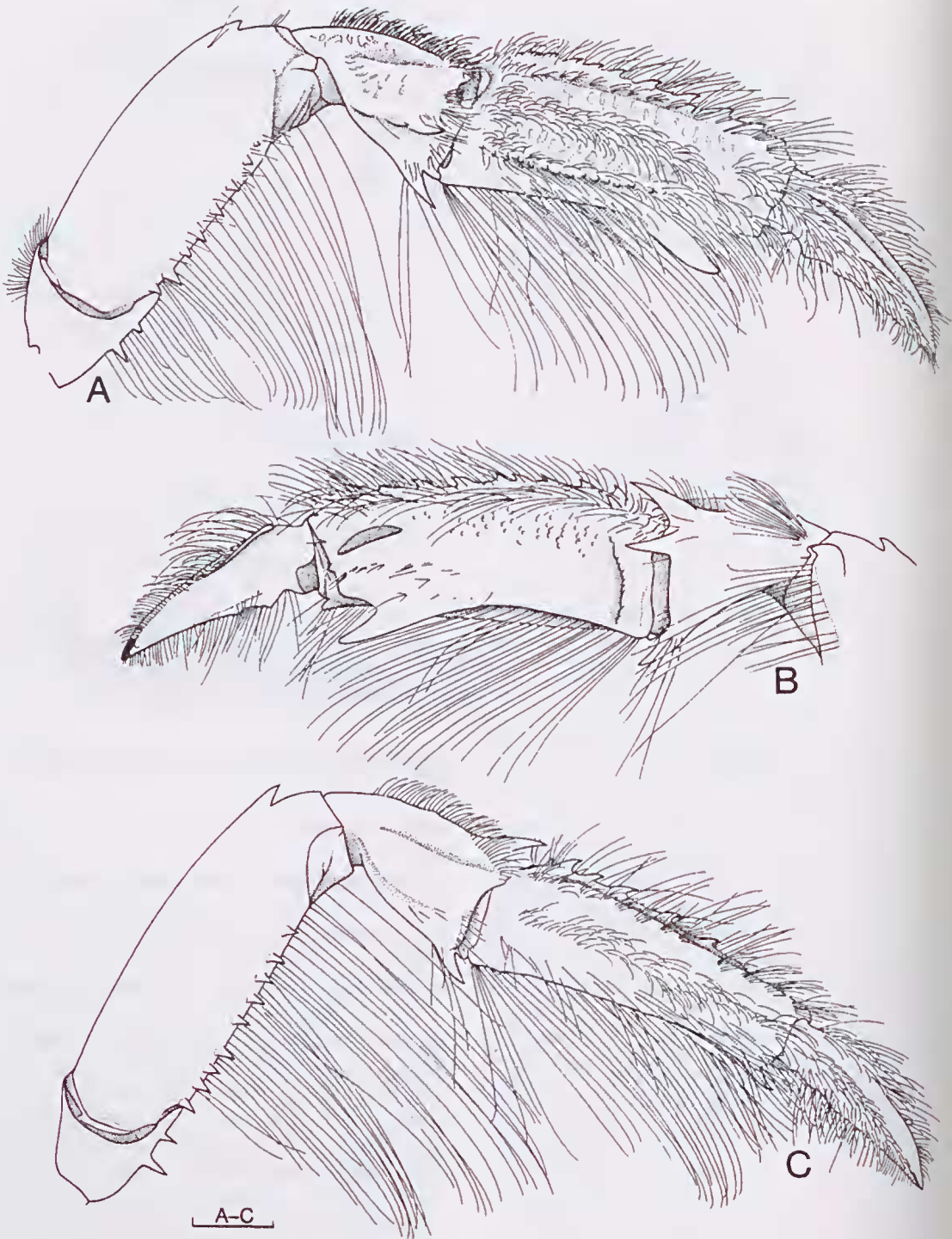


Fig. 2. *Upogebia wuhsienweni* Yu, 1931. A, pereopod I, male, lateral view; B, same, mesial view; C, pereopod I, female, lateral view. A-B, male, NTM Cr.0003932a; C, female, NTM Cr.0003932b. Scale in 1 mm divisions.

median and ventral bands of setae, ventrally with row of denticles; mesial surface with single crescent shaped ridge distally (Fig. 2B), band of setae dorsally, and obtuse denticle on distal margin. Robust fixed finger arising far from distoventral angle. Daetyl 0.66 times length of propod; dorsal margin setose; lateral surface setose on ventral half; cutting edge with two low teeth proximally, proximal tooth larger than distal.

Pleopod 1 absent in male. Pleopods 2-5 biramous, exopods much larger than endopods. Uropod with endopod about as long as telson, with prominent proximal protuberance on lateral margin. Exopod slightly longer than endopod, lateral margin unarmed, dorsal surface deeply sculptured.

Female. Pereopod 1 more slender than that of male (Fig. 2C).

Distribution. China (Chiao-Chou Bay (type locality), near Ching-tao, Hsia-men); Hong Kong; Taiwan.

Genus *Neogebicula* Sakai, 1982

Neogebicula s.str. Sakai, 1982:72.

Type species. *Neogebicula alaini* Sakai, 1982, by original designation.

Diagnosis. Rostrum as long or longer as broad, continuous with anterior portion of carapace. Anterior portion of carapace setose, spinous dorsally. Anterolateral margin of carapace with or without spines. Cervical groove entire, with or without spines. Linea thalassinica not always extending onto posterior portion of carapace. Abdominal segment 6 conspicuously elongate, longer than somite 2. Telson smaller than abdominal somite 6, broader than long or longer than broad.

Maxilliped 1 without epipod. Maxilliped 3 with ischium, without crista dentata medially, merus unarmed. Pereopod 1 subchelate or simple, carpus and propod elongate. Pereopods 2-4 simple, pereopod 5 simple or subchelate. Pleopod 1 absent in male, and uniramous, two to three segmented in female. Pleopods 2-5 biramous. Uropod slender, leaf-like, exopod much longer than endopod.

Remarks. *Neogebicula s.str.* Sakai, 1982, was reviewed for this generic diagnosis. *Neogebicula* is similar to *Upogebia* in general features. However, it is distinguished by the following points: abdominal somite 6 is much longer than broad, and longer than somite 2; the telson is small compared to somite 6; the uropod

is slender, leaf-like; the endopod is much longer than the telson; and the exopod is much longer than the endopod. Pereopod 1 with carpus and propod elongate in males and slender in females.

Species included. *Neogebicula alaini* Sakai, 1982; *N. fallax* (de Man, 1905); *N. monochela* (Sakai, 1967); *N. contigua* (Bozic and de Saint Laurent, 1972); *N. gracilis* (Ngoc-Ho, 1990).

Neogebicula fallax (de Man, 1905) (Figs 3-5)

Upogebia (*Upogebia*) *fallax* de Man, 1905:601; 1928:57, pls 2-3, figs 5, 5a-g. Sakai, 1982:53 (in part).

Upogebia fallax - Bozic and de Saint Laurent, 1972:377.

Upogebia (*Upogebia*) *pugnax* - Sakai, 1984a:161 (*nec U. pugnax* de Man).

Upogebia fallax - Ngoc-Ho, 1990:973.

Material. NTM Cr.000833, one male, TL 18, CL (including rostrum) 5.0; one ovig. female, TL 23.0, CL 6; 3 females, TL 21-17, CL 6-5; 2 juveniles TL 10.5, Dudley Point, Darwin, NT, 21 September 1982, coll. A.J. Bruce and P. Horner.

Diagnosis. Rostrum triangular, with five to eight lateral spines. Anterolateral margin of carapace with small spine. Linea thalassinica extends whole length of posterior portion of carapace. Abdominal somite 6 elongate. Telson broader than long, uropodal exopod and endopod slender.

Pereopod 1 in male subchelate; ventral margin of merus with four to seven spines, dorsal margin with one subterminal spine; distodorsal carpal margin with three sharp spines, distoventral carpal spine present; fixed finger short; cutting edge of daetyl with small proximal and large middle teeth, and mesial surface with median row of tubercles proximally.

Pereopod 1 simple in female; distodorsal margin of carpus with three sharp spines, distoventral carpal angle unarmed; propod slender, distoventral angle with small spine; dorsal margin of daetyl serrate, ventral margin smooth.

Description of male. Anterior region of carapace twice as long as posterior region. Cervical groove entire, unarmed. Rostrum narrow (Fig. 3B), slightly longer than wide, converging distally towards blunt tip, dorsal surface setose, some tubercles along both sides of shallow median groove (Fig. 3A), laterally with row of five to eight spines. Posterior to rostrum, dorsal surface of carapace setose, sparsely tuberculate; lateral

crest narrow, with row of 12-14 spines, anterior spine much stronger than posterior spines. Lateral groove narrow. Anterolateral margin of carapace armed with small spine behind eyestalk. Posterior region of carapace smooth. Epistome terminated in single spine.

Abdominal somite 6 (Fig. 3C) elongate, about 1.6 times as long as somite 5 and twice as long as telson. Telson about 1.3 times as wide as long, convex on dorsal surface; lateral margins parallel anteriorly, slightly converging in posterior half to rounded posterolateral angles, posterior margin concave medially.

Antennular peduncle slightly exceeding rostrum, without spines; flagella about as long as articles 1 and 2 combined. Antennal peduncle slightly exceeds antennular peduncle; article 3 with sharp subterminal spine; article 4 also with one to two sharp spines; sephoerite protruded dorsally as slender spine.

Maxilliped 1 (Fig. 4A) with endopod reaching to level of distal margin of exopod; slender distal

protrusion of exopod two-segmented. Maxilliped 2 (Fig. 4B) with exopod bearing four-segmented flagellum. Maxilliped 3 (Fig. 4C) with exopod bearing narrow, two-segmented distal flagellum.

Pereopod 1 subchelate. Coxa with small posterodistal spine. Basis and ischium without spines. Merus (Fig. 5A) with four to seven spines on ventral margin, and subterminal spine on dorsal margin. Carpus 2.8 times as long as wide, distodorsal margin with two strong spines, one spine at distoventral angle. Propod twice as long as carpus, three times as long as wide, without spines; fixed finger produced anteriorly, without spines. Dactyl one third length of propod, dorso-lateral surface shallowly sulcate; cutting edge (Fig. 5A-B) with two blunt spines on both proximal and median parts, mesial surface with median row of tubercles proximally (Fig. 5C). Pereopod 2 chelate, coxa, basis and ischium unarmed; merus with three to four spines distally on ventral margin and subterminal spine on dorsal margin. Carpus with two dorsal and one

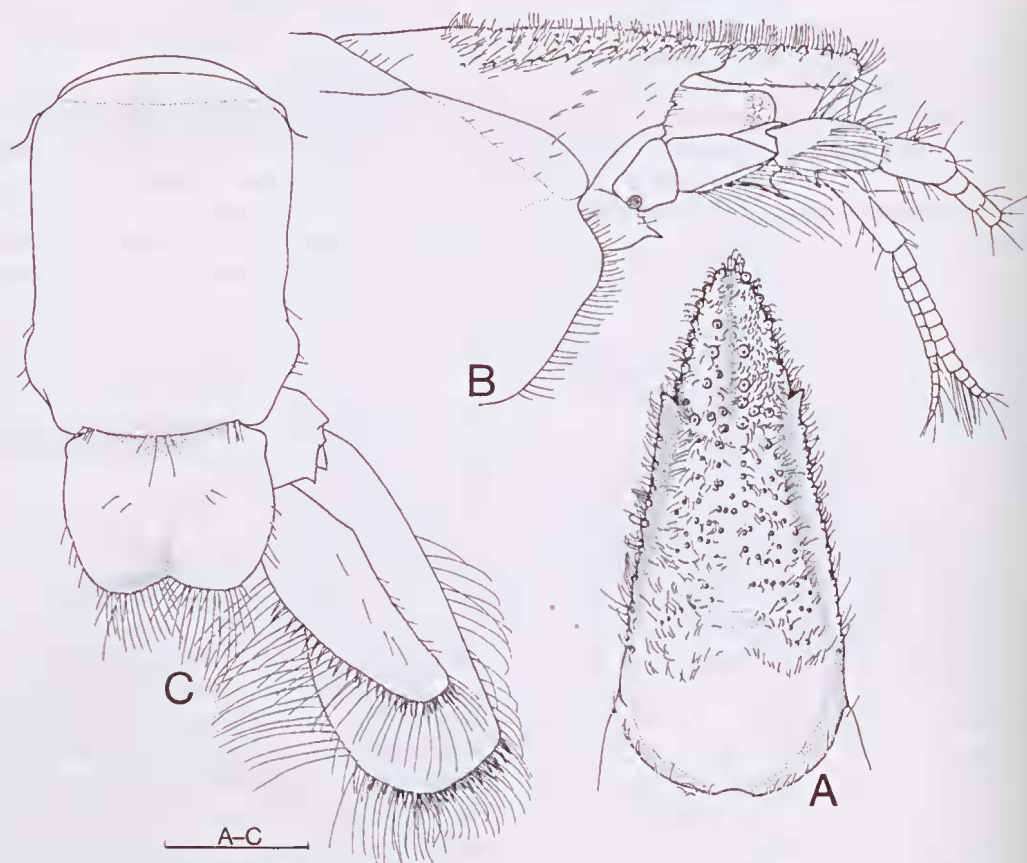


Fig. 3. *Neogebicula fallax* (de Man, 1905). A-B, anterior region of carapace, dorsal and lateral views; C, abdominal somite 6 and tail-fan, dorsal view. A-C, male, NTM Cr.000833. Scale in 1 mm divisions.

ventral spines. Pereopod 3 with coxa, basis and ischium unarmed; merus with three spines on ventral margin, without spines on dorsal margin; carpus with one dorsal and one ventral spines distally. Pereopods 4 and 5 unarmed.

Pleopod 1 absent. Uropod exopod and endopod (Fig. 3C) long and slender; exopod more than twice as long as telson, endopod smaller and shorter than exopod; protopod with spine near base of endopod.

Description of female. Anterior region of carapace more spinulate than in male. Rostrum with six to eight spines on lateral margin. lateral crest of carapace with 12-13 spines. Cervical groove laterally with four to five spinules.

Pereopod 1 (Fig. 5D) more slender than in male. Coxa with tubercle on posterodistal part. Ischium with tubercle on ventroproximal part. Merus 3.7 times as long as wide, with five spines on ventral and one subterminal spine on dorsal margin. Carpus half length of merus, two sharp spines on dorsal angle, one spine on distomesial margin, no spine at distoventral angle. Propod slender, four times as long as wide, 1.8 times length of carpus, fixed finger (Fig. 5D-E) represented as a small spine, not protruding over distal margin of propod. Dactyl 0.33 length of propod, mesial surface slightly convex in middle line, dorsal margin serrate, and cutting edge unarmed.

Pleopod 1 two jointed. Eggs as few as 12 eggs in number, but large, measuring 1.3 mm in diameter.

Remarks. *Neogebicula fallax* was once thought to be identical to *U. pugnax* de Man, 1905 (Sakai, 1982:52). The present male specimen from Australia, the male of the type described by de Man, and the male treated by Ngoe-Ho (1990:974) all differ in some points. In de Man's male type specimen, measuring 12 mm in total length (1928:57, Pl. 3, figs 5a-g), the telson has a very small spine in the middle of the posterior margin, and the propod of the cheliped has a row of spines on the dorsal margin (de Man, 1928, Pl. 3, fig 5c), while in the present male, as well as Ngoe-ho's male measuring 7 mm in total length, the telson has no median spine on the posterior margin, and the propod of the cheliped is unarmed. In de Man's as well as Ngoe-Ho's males, the dactyl of pereopod 1 is armed dorsally with small corneous denticles, while in the present male it is slightly denticulated. In the present female, the dactyl of pereopod 1 has conspicuous corneous spines.

The present male and female show further variation in some characters. In the male, pereopod 1 is subchelate, the distoventral carpal spine is present, the fixed finger is stout, the cutting edge of the dactyl armed with two obtuse teeth, the telson conspicuously concave on its posterior margin, and the cervical groove is without spines laterally. In the female, pereopod 1 is simple, the distoventral carpal spine is absent, the fixed finger is not developed, being represented only by a small spine, the cutting

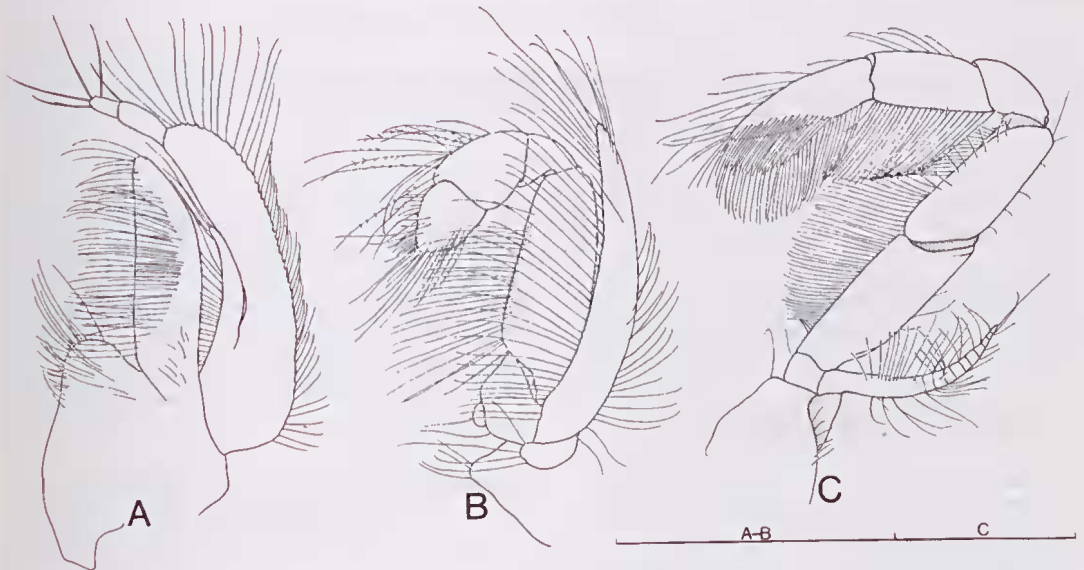


Fig. 4. *Neogebicula fallax* (de Man, 1905). A-C, maxillipeds 1-3, lateral views. Male, NTM Cr.000833. Scale in 1 mm divisions.

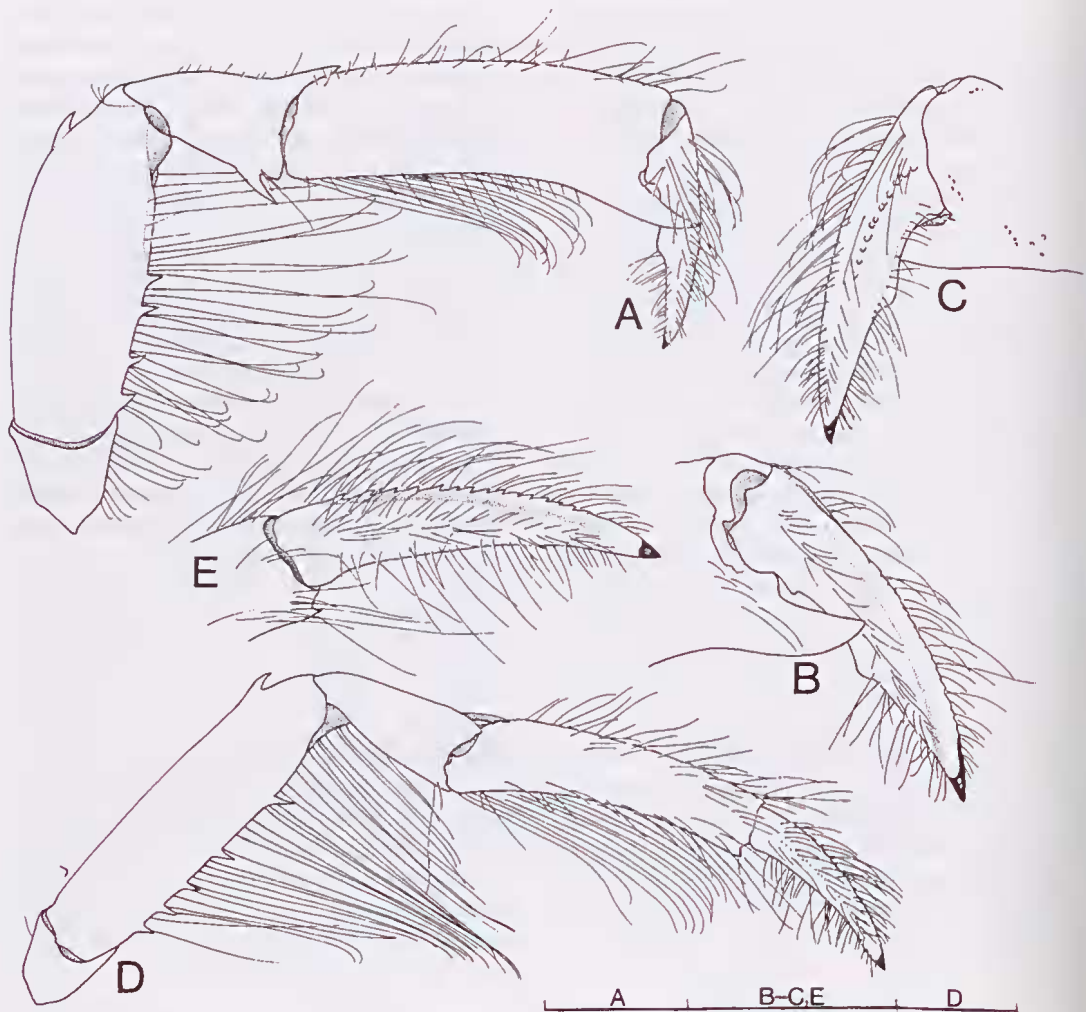


Fig. 5. *Neogebicula fallax* (de Man, 1905). A, pereopod 1, lateral view; B, pereopod 1, distal part of propod and dactyl, lateral view; C, same, medial view; D, pereopod 1, lateral view; E, pereopod 1, distal part of propod and dactyl, lateral view. A-C, male and D-E, female, NTM Cr.000833. Scale in 1 mm divisions.

edge of the dactyl is unarmed, the telson is slightly concave on the posterior margin, and the cervical groove is provided with a few spines.

Distribution. Indonesia (Samau (type locality), West Timor); Northern Territory (Darwin). Darwin is the southernmost record of *N. fallax*.

Genus *Gebiacantha* Ngoc-Ho, 1989

Gebiacantha Ngoc-Ho, 1989:118.

Type species. *Upogebia talismani* Bouvier, 1915, by original designation.

Diagnosis. Rostrum elongate, lateral crest scarcely produced anteriorly; ventral margin with one or more spines. Anterolateral margin of

carapace with two or more spines. Telson slightly or strongly concave on posterior margin. Maxilliped 3 with or without finely denticulate crista dentata on ischium; exopod present. Pereopod 1 subchelate; carpus and propod armed with many spines; fixed finger spiniform, not exceeding half dactyl length. Pereopods 1-3 or 4 with coxa bearing mesial spines. Uropod relatively long, exopod exceeding telson.

Gebiacantha acutispina (de Saint Laurent and Ngoc-Ho, 1979) (Fig. 6)

Upogebia acutispina de Saint Laurent and Ngoc-Ho, 1979:57, figs. 1-24.

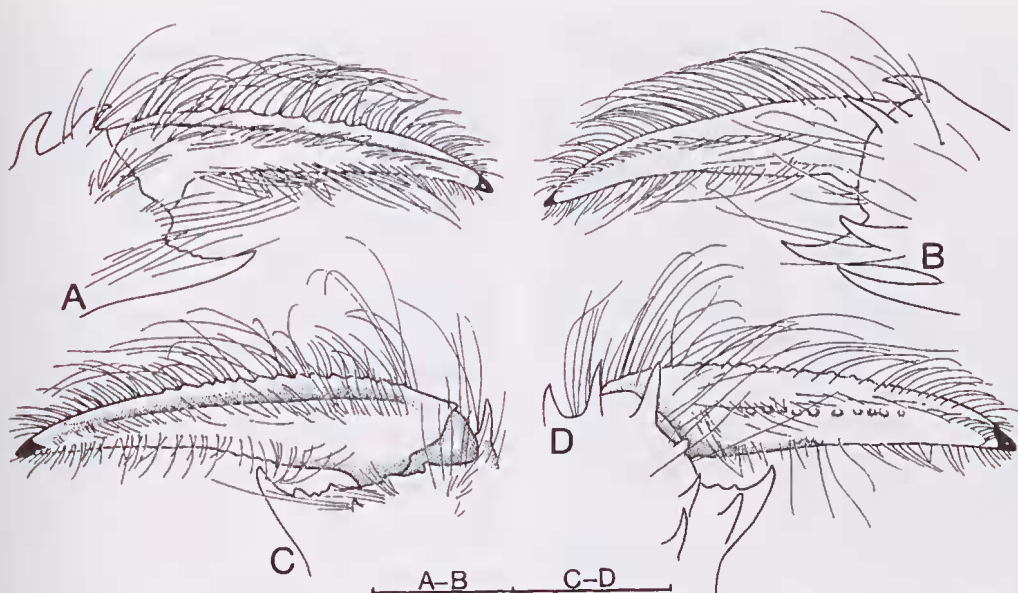


Fig. 6. *Gebiacantha acutispina* (de Saint Laurent & Ngoc-Ho, 1979). A, dactyl, lateral view; B, same, medial view; C, dactyl, lateral view; D, same, medial view. A-B, female, holotype of *Upogebia acutispina*, BMNH 1892-3-26. *Upogebia niugini* (Poore, 1982). C-D, female, holotype, NMV J 1653. Scale in 1 mm divisions.

Upogebia ceratophora - Sakai, 1982:49 (partim).

Upogebia niugini - Poore, 1982:169, figs 1,2.

Gebiacantha acutispina - Ngoc-Ho, 1989:122.

Material. HOLOTYPE of *U. acutispina*, - BMNH 1892-3-26, one female, TL 29.0, CL 9.0, Australia, Holothuria Bank, 13°35'S 126°00'E. Coll. and date unknown.

PARATYPE of *U. acutispina*, - one male, TL 23.0, CL 7.0, same data as for holotype.

HOLOTYPE of *U. niugini* - NMV J 1653, one female, TL 27.0, CL 9.1, Papua New Guinea, Port Moresby, 80 m off E side of Esade Reef, 28 July 1981, 15 m, shelly-muddy sediment, J. Watson and J. Carey.

PARATYPES of *U. niugini* - NMV J1653, one female, TL 23.0, CL 7.1; 1, TL 25.0, CL 8.1, same data as for holotype.

Diagnosis. Rostrum 1.5 times as long as wide, hirsute, with seven lateral spines, three ventral spines. Four anterolateral spines. Lateral crest only slightly developed anteriorly. Cervical groove with seven posterior spines. Linea thalassinica extends whole length of posterior portion of carapace. Telson slightly wider than long, posterior margin concave. Pereopod 1 with eight ventral meral spines, one to two dorsal meral subterminal spines; two distomesial carpal spines, five dorsal carpal spines, distoventral carpal spine short, ventrolateral margin unarmed;

dorsal margin of propod with 12 sharp spines, mesial surface with three rows of sharp spines, ventral margin with three sharp spines at base of fixed finger; fixed finger with three denticles on cutting edge proximally; dorsal margin of dactyl spinulate, and mesial surface longitudinally carinate, with row of tubercles medially.

Remarks. The female holotypes of *Upogebia acutispina* and *U. niugini* were re-examined. *Gebiacantha niugini* is already a junior synonym of *G. acutispina*, as Ngoc-Ho (1989:122) stated, without giving any specific reasons. Poore (1982:172) mentioned that "the three ventral rostral spines are shorter in *U. niugini*, the telson relatively broader, and the rostrum narrower than in *U. acutispina*". In addition, it is noticeable that the spines on the carpus and propod of pereopod 1 are shorter and fewer in number than in *G. acutispina*. Observations of the two female holotypes reveal that in *G. acutispina* the cutting edge of the fixed finger of pereopod 1 has three obtuse denticles; the dorsal margin of the dactyl is armed with 11 denticles on its proximal two-thirds (Fig. 6A), and is smoothly carinate on the distal one-third. In *G. niugini*, the cutting edge of the fixed finger has two obtuse denticles, the dorsal margin of the dactyl has 15 more distinct denticles (Fig. 6C) than has *G. acutispina*, and also is carinate on the distal third. The armature of the fixed finger and dactyl in both *G. acutispina*

and *G. niugini* is almost the same. The spination of the rostrum and pereopod 1 are also indistinguishable as Poore (1982) mentioned.

The holotype of *U. niugini* is definitely a female, with the genital pore of pereopod 3 as shown by Poore (1982: 170). However, it seems that pereopod 1, detached from the body, does not belong to the specimen, because it is unusually stout for a female; the merus is about 2.5 times as long as wide; the propod is also broad, 2.0 times as long as wide, and the mesial surface of dactyl has a median row of tubercles (Fig. 6D). In contrast, the female holotype of *U. acutispina* has pereopod 1 merus three times as long as wide; the propod 2.5 times as long as wide, and the mesial surface of the dactyl has no median row of tubercles (Fig. 6B).

Gonochorism is found in the Upogebiidae, in which pereopod 1 in males is much stouter than in females; thus, the differences between the pereopod 1 of *G. acutispina* and *U. niugini* may be due to sexual differences.

Distribution. Australia (Holothuria Bank (type locality)); Papua New Guinea (Port Moresby (type locality of *U. niugini*)).

***Gebiacantha priochela* sp. nov.**
(Figs 7-9)

Type material. HOLOTYPE - NTM Cr.007322A, one male, TL including rostrum 33.0, CL excluding rostrum 8.2, R 2.0; West of Fog Bay, NT, 12°41.5'S 129°26.0'E, 54 m water depth, 23 July 1990, coll. Steve Coe, part of vast school on surface at night.

PARATYPES - NTM Cr.0007322B, one male, TL 34.0, CL 9.0, R 2.0, same data as for holotype. (ALLOTYPE) NTM Cr.007322C, one female, TL 31.0, CL 8.0, R 1.8, same data as for holotype. NTM Cr.008501, 2 males, TL 24.0, CL 6.5, R 1.2; TL 25.0, CL 7.0, R 1.5; one female, TL 23.0, CL 5.5, R 1.2, Central Great Barrier Reef, Qld, 50 km offshore, 14 April 1988, coll. N. Preston. NTM Cr.008502, 2 males, TL 35.0, CL 9.0, R 2.0; TL 31.0, CL 7.8, R 1.5, North West Shelf, WA, 19°56.6'S 117°53.6'E, 42 m, 22 April 1983, coll. FRV *Soela* 0283. NTM Cr.000790, 2 females, TL 30.0-32.0, North West Shelf, WA, 19°58.9'S 117°53.7'E, 22 April 1983, coll. A.J. Bruce. NTM Cr.00785, 2 females, TL 29.0-31.0, North West Shelf, WA, 19°58.9'S 117°51.3'E, 40 m, 22 April 1983, coll. A.J. Bruce. NTM Cr.000818, one female, TL 25.0, coll. FRV *Soela*, North West Shelf, WA, 1983. NTM Cr.007345A, 119 males, TL 37.0-22.0, 114 fe-

males, TL 38.0-21.0, 12°32'S 129°30'E, on surface, 26 June 1990, coll. NT Fisheries. USNM 252595, 2 males, TL 36.0-34.0, 2 females, TL 36.0-33.0; SMF 19478, 2 males, TL 36.0-34.0, 2 females, TL 36.0-33.0. RMNH D41762, 2 males, TL 36.0-34.0, 2 females, TL 36.0, 36.0. BLT 5667, 2 males, TL 36.0-34.0, 2 females, TL 35.0; 35.0, 12°32'S 129°30'E, on surface, 26 June 1990, coll. NT Fisheries.

Other material examined. NTM Cr.007345B, 30 individuals, damaged, 12°32'S 129°30'E, on surface, 26 June 1990, coll. NT Fisheries.

Diagnosis. Rostrum 1.1 times as long as wide, with nine lateral spines, three ventral spines. Anterolateral margin of carapace with five spines. Lateral crest not produced forward. Cervical groove with one sharp spine. Telson about as long as wide, posterior margin slightly concave.

Pereopod 1 subchelate. Male with 17 ventral meral spines, dorsal subterminal meral spine present; three sharp distomesial carpal spines, four dorsal carpal spines, dorsomesial surface with 26 spines, ventrolateral margin of carpus spinulate, distoventral spine sharp; dorsal margin of propod with nine large sharp and four small spines, mesial surface with three rows of spines, ventral margin with two spines at base of fixed finger; distal spine short, penultimate spine represented by fixed finger, strongly produced forward, cutting edge unarmed, small spine posterior to penultimate spine; dorsolateral surface of dactyl with row of 11 stout, corrugated transverse ridges. Females as in males, but with ventrolateral carina of carpus unarmed; mesial surface of propod with two rows of spines; dorsal margin of dactyl with five to seven stout rounded tubercles.

Description of male holotype. Anterior region of carapace 3.33 times longer than posterior. Cervical groove distinctly defined dorsally, extending to anterior margin of carapace across linea thalassinica, with some denticles on dorso-lateral and anterolateral regions, and with sharp anteriorly-directed spine beneath intersection between cervical groove and linea thalassinica. Linea thalassinica extending whole length of carapace. Rostrum (Fig. 7A) rounded, 1.1 times as long as wide, with four rows of spines; marginal row with nine spines, and median row with seven spines, extending onto gastric region along median groove, central region medially with smooth shallow groove except in distal third, posterior to median convexity of anterior gastric region, with four tubercles; ventral surface (Fig. 7B) strongly carinate with three sharp spines.

anterior spine reaching beyond rostral tip. Gastric region separated from rostrum by broad lateral groove; lateral crest with nine spines; major part of gastric region and rostrum with dense cover of setae dorsally. Anterior margin of carapace with five sharp spines; lateral region with one (left) and three (right) tubercles.

Antennular segment 1 with sharp distoventral spine, flagella shorter than peduncle. Antennal segment 1 with distoventral denticle; segment 2 with two small proximal dorsal denticles; segment 3 with four ventral spines, distal spine sharp; segment 4 with three sharp spines, scaphocerite small bifid scale.

Maxilliped 3 (Fig. 7D) with exopod consisting of long proximal segment and three-jointed distal segment; coxa with epipod, two denticles on mesial margin, three weak spines on lateral margin; basis unarmed; ischium with two small

proximal spines on interior surface, with row of denticles on mesial margin.

Pereopod 1 subchelate. Coxa (Fig. 8A) with one sharp mesial spine. Basis unarmed. Ischium with one sharp ventral spine. Merus 2.3 times as long as wide, with row of 17 spines on ventral margin and one subterminal spine on dorsal margin. Carpus with 30 small sharp spines scattered over dorsal surface, four on dorsomesial margin; three prominent spines (Fig. 8B) on distodorsal margin; one prominent spine on distoventral margin; lateral surface carinate ventrally, with row of tubercles. Propod about twice as long as wide, with nine sharp spines and four small intermediate spines on dorsal margin; mesial surface with rows of long setae, and three rows of short spines, upper row with 16 small spines, median row with seven spines, lower row with four spines, distomesial margin with two

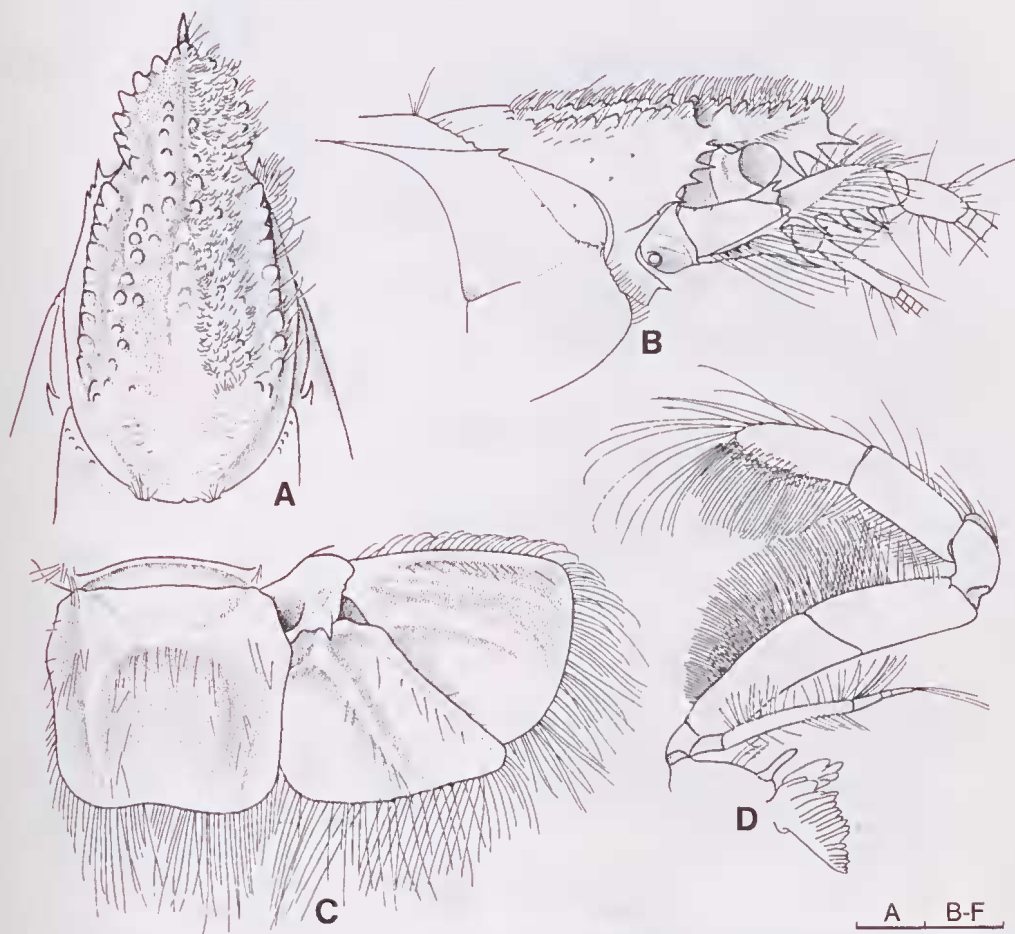


Fig. 7. *Gebiacantha priochele* sp. nov. A-B, anterior region of carapace, dorsal and lateral views; C, telson and uropod; D, maxilliped 3, lateral view. A-D, male, holotype, NTM Cr.0007322A. Scale in 1 mm divisions.

spines; ventral margin with three spines; distal spine short, broadly based, unarmed; penultimate spine represented by fixed finger, strongly produced forward posterior to distal spine, unarmed on cutting edge, and small spine proximal to penultimate spine. Dactyl 0.8 times as long as propod; dorsolateral surface corrugated by series

of 11 transverse ridges (Fig. 9B); mesial surface with median row of tubercles; ventromesial surface irregularly tuberculate (Fig. 9C); ventral margin proximally with row of three tubercles, smooth distally.

Pereopod 2 with coxa bearing seven to nine sharp denticles on mesial surface. Basis and

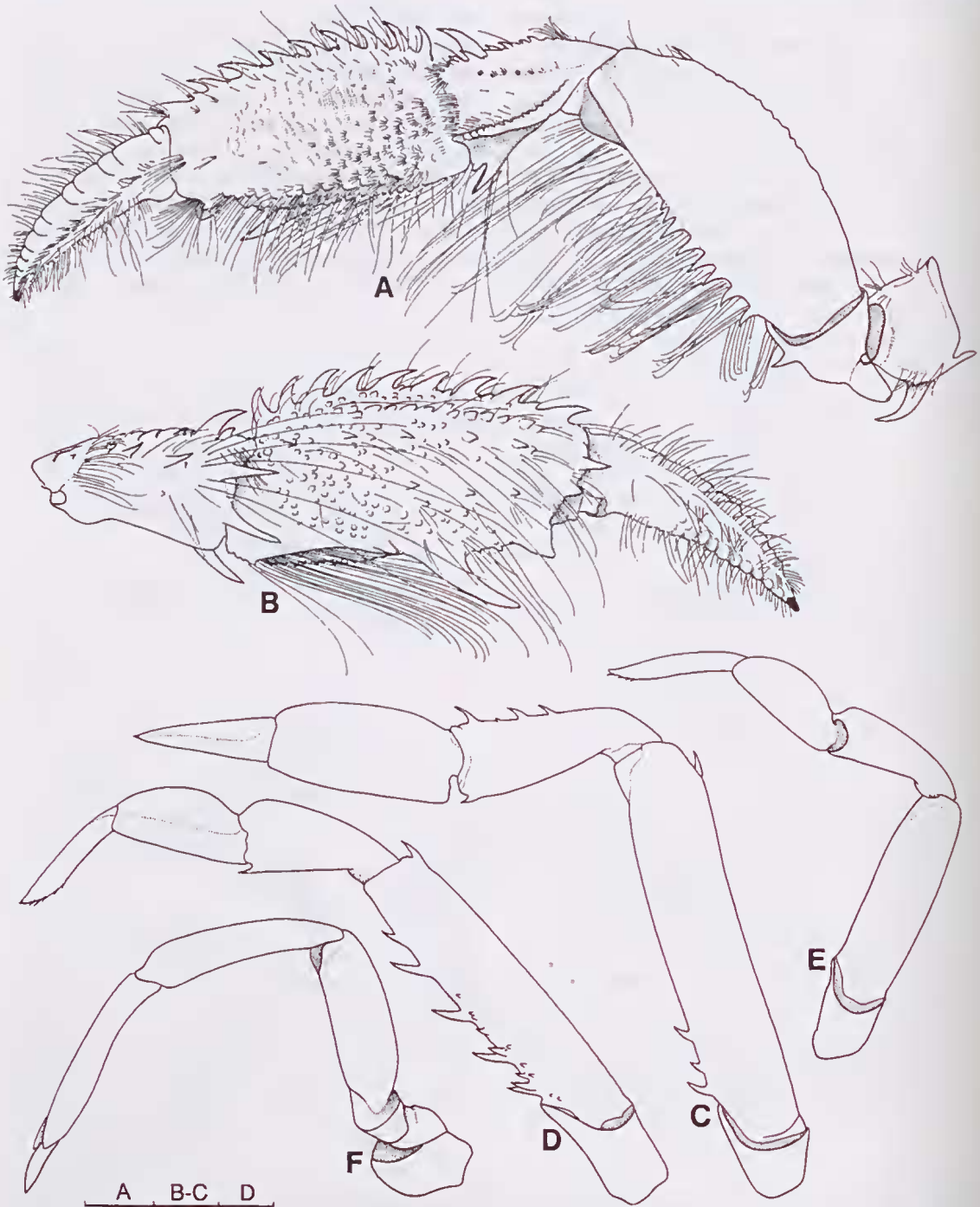


Fig. 8. *Gebiacantha priochele* sp. nov. A, pereopod 1, lateral view; B, pereopod 1, medial view; C-F, pereopods 2-5. A-F, lateral view, male, holotype, NTM Cr.0007322A. Scale in 1 mm divisions.

ischium unarmed. Merus (Fig. 8C) with three spines on ventral margin and one subterminal spine on dorsal margin. Carpus with three dorsal spines and one terminal spine on ventral margin. Propod unarmed. Pereopod 3 with coxa bearing nine sharp denticles on mesial surface. Basis and ischium unarmed. Merus with six to eight sharp spines and 10 small denticles on ventral margin (Fig. 8D), with terminal spine on dorsal margin. Carpus unarmed on dorsal margin, with distoventral spine. Pereopod 4 (Fig. 8E) unarmed. Pereopod 5 (Fig. 8F) subchelate.

Pleopod absent.

Uropods (Fig. 7C) as long as telson, exopod 1.3 times as long as wide, endopod as long as wide. Protopod with sharp spine on posterior margin. Telson 0.9 times as long as wide, expanded proximally on lateral margins; posterior margin with shallow concavity.

Description of female allotype. Females show slight differences in spinulation and other differences noted below.

Rostrum 1.1 times as long as wide, with nine marginal spines. Lateral crest of gastric region with 9-10 spines.

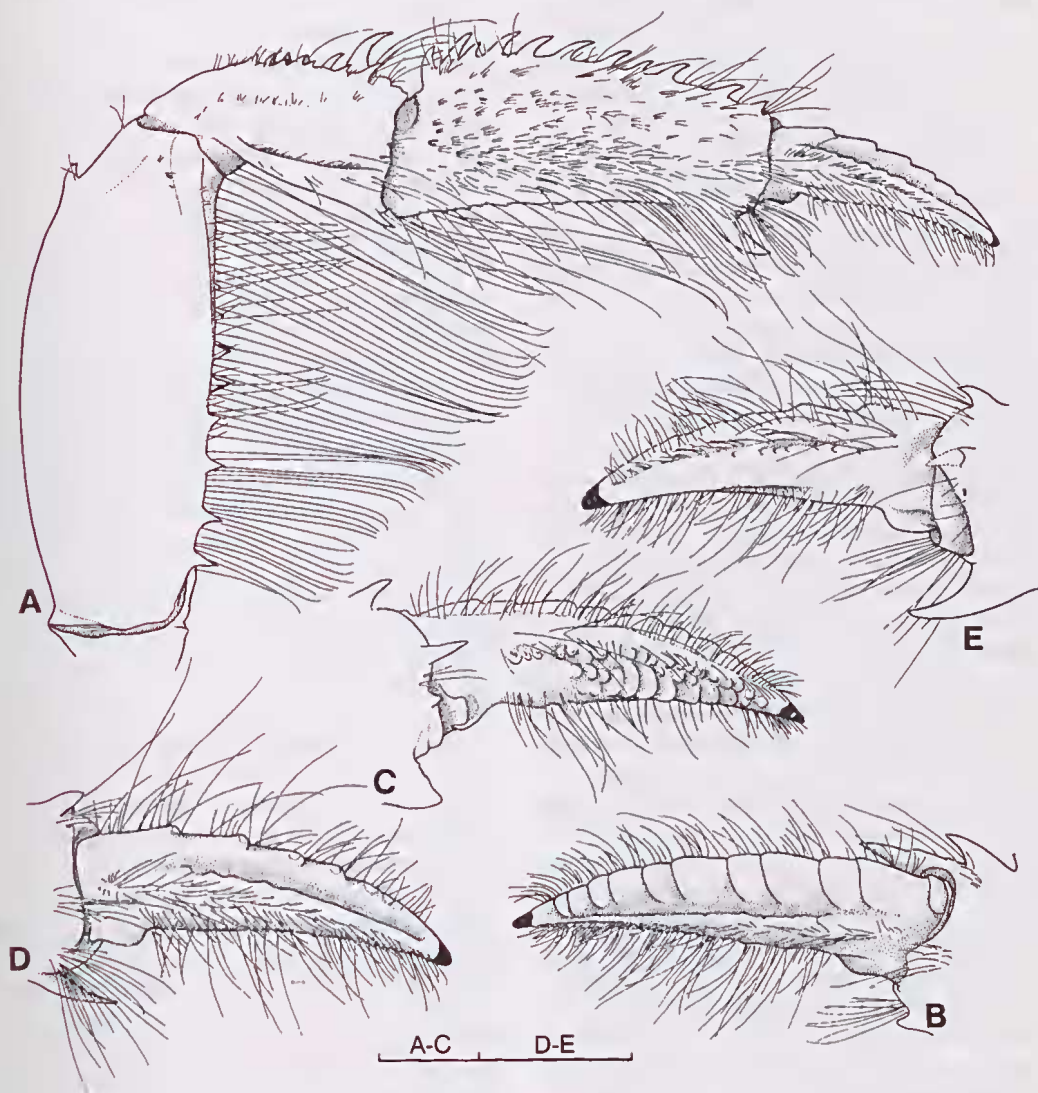


Fig. 9. *Gebiacantha priochela* sp. nov. A, pereopod I, lateral view; B, dactyl, lateral view; C, same, medial view; D, dactyl, lateral view; E, same, medial view. A, D-E, female, paratype, NTM Cr.000790; B-C, male, holotype, NTM Cr.00073220A. Scale in 1 mm divisions.

Antennal segment 1 with distoventral denticle, segment 2 unarmed, segment 3 with two to three ventral spines, segment 4 with two ventral spines.

Pereopod 1 (Fig. 9A) with merus bearing six sharp and five small spines on ventral margin including one subterminal spine. Carpus with 20 spines on dorsal surface, including three prominent spines on distomesial margin; one prominent spine on distoventral margin; lateral surface with thick ventral carina without denticles. Propod 2.5 times as long as wide, with nine sharp spines on dorsal margin; mesial surface with rows of long setae and two rows of spines, upper row with four to five spines including distal marginal spine; lower row with three to four widely spaced spines; ventral margin with three spines, distal two spines sharp. Dactyl 0.8 times as long as propod; dorsal margin with row of five to seven stout, rounded tubercles (Fig. 9D); lateral surface with distinct median carina bearing tubercles proximally; mesial surface with median row of tubercles (Fig. 9E); ventromesial surface smooth; proximal half of ventral margin thickened.

Pleopod 1 with two segments.

Habitat. The specimens (NTM Cr.0007322, Cr.0007345) were collected from a vast nocturnal surface school over 16 km of quite shallow water.

Etymology. The species name *priochela* was derived from the Greek words, *priou*, meaning a saw, and *chela*, meaning a claw. It refers to the serrate dorsal margin of the first pereopod.

Remarks. *Gebiacantha priochela* is closely related to *G. acutispina* from the seas north of Australia. However, it is distinguished by: the spines on the carpus of pereopod 1 being more numerous than in *G. acutispina*, the cutting edge of the fixed finger smooth, the dorsolateral surface of the dactyl in the male corrugated by a series of transverse ridges, and a median carina on the mesial surface of the dactyl. In *G. acutispina*, the cutting edge of the fixed finger has a few obtuse denticles, and the dactyl does not have a carina or a row of tuberculate ridges on the dorsal margin, but has a row of 11-15 denticles on the proximal two-thirds of the dorsal margin and is smooth distally. De Saint Laurent and Ngoe-Ho (1979:62) state in their description "Dactyle ..., face interne lisse,..." and this character could be confirmed upon examination of the female holotype of *G. acutispina*. The mesial surface of the dactyl is carinate medially with a row of tubercles in the female holotype of

Upogebia uuigini (probably not female but male as stated in the remarks on *G. acutispina*). However, this difference is due to gonochorism.

The carpus of pereopod 1 of the female holotype of *G. acutispina* has 12 curved spines scattered over the dorsal edge, including two prominent spines on the distal mesial margin; the propod has 12 spines on the dorsal margin, three irregular longitudinal rows of strong curved spines on the mesial surface, the upper row with eight spines, the median and lower rows each with six spines; the cutting edge of the fixed finger has three obtuse denticles; the dorsal margin of the dactyl has a row of 11 denticles on its proximal two-thirds, and the mesial surface lacks a median row of tubercles.

The female of *G. priochela*, however, has about 20 spines on the dorsal surface of the carpus of pereopod 1, including three sharp spines on the distomesial margin; the propod has nine spines on its dorsal margin; with two irregular longitudinal rows of spines on the mesial surface, the upper row with four to five spines, the lower row with three to four spines; the cutting edge of the fixed finger is smooth; the dactyl with a row of five to seven thick rounded tubercles dorsally, mesially with a distinct median carina bearing tubercles proximally; in the male the carpus of pereopod 1 has 30 spines, the propod has nine spines on the dorsal margin; the mesial surface with three rows of spines, the upper row with 16 small spines, the middle with eight, and the lower with five; the cutting edge of the fixed finger is unarmed; the dorsolateral surface of the dactyl has a row of transverse ridges, and the mesial surface has a row of tubercles medially.

This new species is gonochoristic in the external characters of pereopod 1; the propod of pereopod 1 in males is broader, and the mesial surface more spinous, than in females; the tubercles on the dorsal surface of the dactyl are acute in male, while they are rounded in females; and the dorsolateral surface of the dactyl is remarkably different in the sexes.

There are apparently two forms of males, differing in the morphology of pereopod 1. In the first type, pereopod 1 is stout, with a very small fixed finger, the external surface of the propod has a longitudinal row of large rounded tubercles near the ventral border, and the mesial surface is covered with tubercles and spinules. The second type has a slender propod similar to that in the female, with a large fixed finger, the external surface of the propod has a row of small tuber-

cles, and the mesial surface has rather large spines.

Among the type specimens of *Gebiacantha priocheila*, the "stout" form was found on the North West Shelf and the "slender" mainly from Queensland. Material from Darwin exhibits both forms NTM Cr.007345A contains two "stout" males and three "slender" ones).

Distribution. Queensland (central Great Barrier Reef), Northern Territory (west of Fog Bay (type locality)); Western Australia (North West Shelf).

Acutigebia Sakai, 1982

Acutigebia s. str. Sakai, 1982:69.

Type species. *Gebia danai* Miers, 1876, by subsequent designation.

Diagnosis. Rostrum triangular, with apical spine, lateral crest produced anteriorly with pointed tip, flanked on each side by broad furrow. Anterolateral margin of carapace unarmed. Cervical groove well marked. Linea thalassinica extending whole length, partly posteriorly, or absent. Abdomen depressed, abdominal segment 6 rectangular. Telson rectangular, almost straight on posterior margin. Maxilliped 1 without epipod. Maxilliped 2 with dactyl attached to propod subterminally; exopod with biarticulate flagellum. Maxilliped 3 with ischium bearing crista dentata on mesial surface, merus with two to four sharp spines on mesial surface; exopod with biarticulate flagellum. Pereopod 1 subchelate; dactyl sulcate on dorsolateral surface. Pereopods 2-4 simple, pereopod 5 subchelate. Pleopod 1 absent in male, uniramous, biarticulate in female. Plcopods 2-5 biramous, without appendix internac. Uropod longer than telson.

Remarks. Poore and Griffin (1979:303) first noticed that "This species [*U. simsoni* (Thomson, 1893)] is notable among *Upogebia* in having a mesial row of spines on the ischium of maxilliped 3". Later, Sakai (1982:69) established the subgenus *Acutigebia* for the species *U. danai* (Miers, 1876), *U. simsoni*, *U. sp. α* de Man, 1928, and *U. trymeta* Sakai, 1970, on the basis of the crista dentata mentioned above and other characteristics.

In the genus *Acutigebia*, the rostrum is broadly separated from the lateral crests by a broad interspace, while in *Upogebia*, *Neogebicula* and *Wolffogebia* the rostrum is usually separated from the lateral crests by a narrow, deep fissure, and in *Tuerkayogebia* Sakai, 1982 it is simply

produced forward without development of lateral crests. The dactyl of maxilliped 2 usually articulates with the distal face of the propod. However, in *A. simsoni*, *A. kyphosoma* sp. n., and probably *A. trymeta*, it articulates ventrally with the subterminal part of the propod. In *A. kyphosoma* sp. n., the exopods of both maxilliped 2 and 3 have a two-segmented flagellum, while *Upogebia* has a multi-articulate flagellum.

Miers' specimen of *Acutigebia danai* was sent to me by courtesy of Mr Paul Clark of the Natural History Museum, London, but it could not be verified as the type, due to the brevity of Miers' original description.

Species included. *Acutigebia danai* (Miers, 1876), *A. simsoni* (Thomson, 1893), *A. kyphosoma* sp. n., *A. sp. α* (de Man, 1928), and probably *A. trymeta* (Sakai, 1970).

Acutigebia kyphosoma sp. n.

(Figs 10-11)

Type material. HOLOTYPE - NTM Cr.000782, one ovig. female. TL 14.0, CL 4.0 including rostrum; 9 eggs attached, diameter 0.5 mm, North West Shelf, WA, 19°55.0'S 117°54.5'E, 7 April 1983, T15, coll. P. Blythe.

Diagnosis. Rostrum triangular with four to five lateral spinules. Lateral crest widely separated from rostrum, apically pointed. Anterolateral margin of carapace unarmed. No linea thalassinica on posterior portion of carapace. Maxilliped 3 with row of denticles on mesial surface of ischium. Telson broader than long, posterior margin slightly concave, with median spine. Pereopod 1 subchelate; ventral mesal margin roughly spinulate, dorsal subterminal spine of merus present; distomesial carpal spine absent, distoventral carpal spine small, dorsal margin of propod with subterminal spine; fixed finger short, cutting edge with four sharp teeth; dorsal margin of dactyl carinate, with denticles, dorsolateral surface of dactyl smoothly sulcate, dorsal region above mesial surface setose, mesial surface smooth, with subventral rows of setae.

Description of female holotype. Anterior region of carapace, including rostrum, 1.7 times as long as posterior region. Rostrum triangular in dorsal view, widening posteriorly, with setae and four to five denticles laterally (Fig. 10A); dorsal surface sparsely denticulate, with broad, shallow concavity medially on anterior third of anterior region. Lateral crest widely separated from rostrum by broad, shallow groove, apically pointed, and with setae and 12-13 denticles

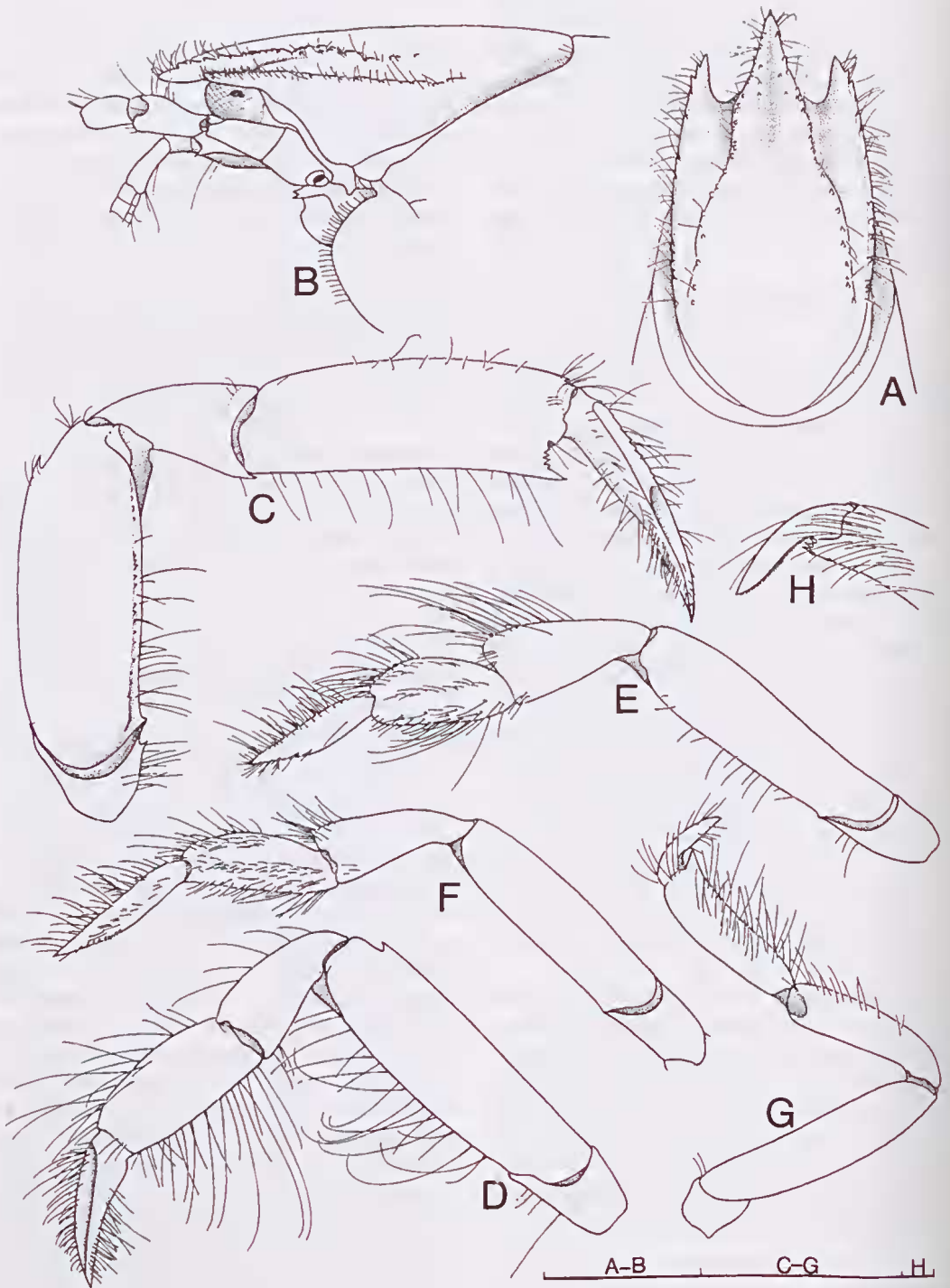


Fig. 10. *Acutigeia kyphosoma* sp. n. A-B, anterior region of carapace, dorsal and lateral views; C-G, pereopods 1-5, lateral views; H, distal part of propod and dactyl of pereopod 5, medial view. A-H, ovig. female, holotype, NTM Cr.000782. Scale in 1 mm divisions.

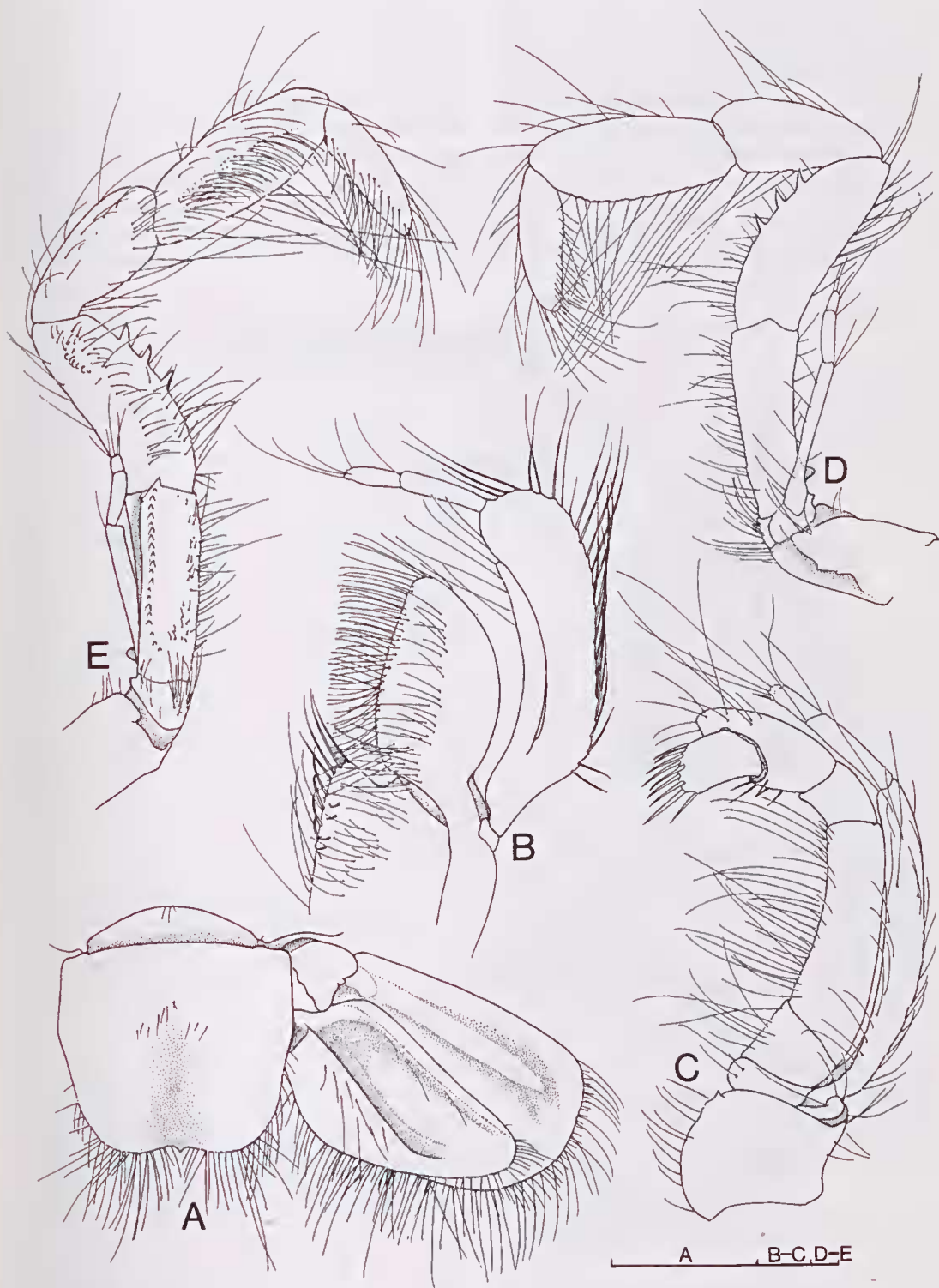


Fig. 11. *Acutigebia kyphosoma* sp. n. A, tail-fan, dorsal view; B-D, maxillipeds 1-3, lateral views; E, maxilliped 3, medial view. A-E, ovig. female, holotype, NTM Cr.000782. Scale in 1 mm divisions.

laterally. Cervical groove entire, without lateral spines. Abdomen smooth, pleuron of segment 1 narrow, widening posteriorly, pleura of segments 2-5 broadly rounded, margins slightly setose; segment 6 rectangular. Telson (Fig. 11A) 0.7 times as long as abdominal somite 6, slightly wider than long, dorsally concave in posterior three-fifths, lateral margins converging posteriorly, posterior margin slightly concave with median spine.

Antennular peduncle without spines, not reaching distal end of antennal peduncle; flagella short.

Antennal article 3 with subterminal spine on ventral margin; scaphognathite bispinose (Fig. 10B).

Maxilliped 1 (Fig. 11B) with palp exceeding distal end of endopod; exopod with two-segmented flagellum. Maxilliped 2 (Fig. 11C) with dactyl subterminal, exopod with two-segmented flagellum. Maxilliped 3 with ischium bearing mesial crista dentata (Fig. 11E); merus with three spines on mesial margin (Fig. 11D-E); exopod with two-segmented distal flagellum.

Pereopod 1 subchelate. Coxa and basis unarmed. Ischium with subterminal spine on ven-

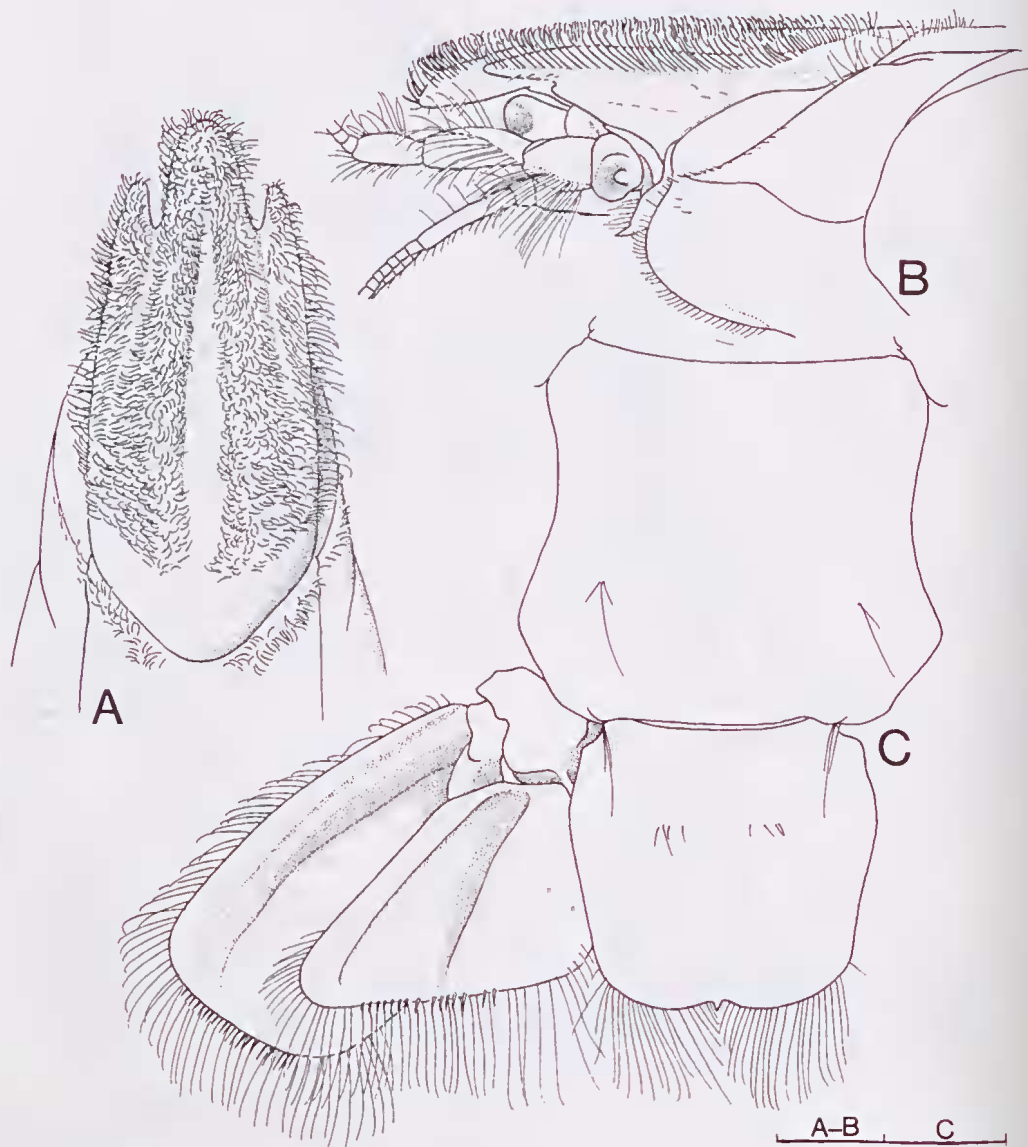


Fig. 12. *Wolffogebia inermis* Sakai, 1982. A-B, anterior portion of carapace, dorsal and lateral views; C, abdominal somite 6 and tail-fan, dorsal view. A-C, ovig. female, NTM Cr.00796. Scale in 1 mm divisions.

tral margin (Fig. 10C). Merus ornamented with rough denticles on ventrolateral margin; dorsal margin with subterminal spine. Carpus with distoventral spine. Propod less than twice length of carpus, terminated by small spine on dorsal margin. Fixed finger triangular with sharply pointed tip, proximally with four sharp denticles on incisor margin. Daetyl shorter than propod; dorsal margin carinate, with denticles; lateral surface medially carinate, shallowly sulcate on dorsal half; dorsal region of mesial surface setose, mesial surface smooth with subventral rows of setae; incisor margin without spines. Pereopods 2-5 as shown in figures (Fig. 10C-H).

Uropod (Fig. 11A) larger than telson, without spines. Exopod longer than endopod, 1.3 times as long as telson; posterior margin slightly exceeding telson. Protopod without spines.

Etymology. The species name is derived from the Greek *kyphos* - humpbacked, plus *soma* - body.

Remarks. This species is closely related to *Acutigeberia simsoni* (Thomson, 1893) from Tasmania, *Acutigeberia* sp. α (de Man, 1928) from Fau-anchorage and lagoon, west coast of G be Island, Indonesia, and *A. trypeta* Sakai, 1970, from the coral reef of Amami-Oshima, Japan. *Acutigeberia kyphosoma* is almost the same size as specimens of *A. trypeta*, measuring 9.4-16.2 mm in total body length, and a female type of *A. sp. \alpha* (de Man, 1928), measuring 14 mm in total length, but is smaller than *A. simsoni* measuring 11-40 mm (Poore and Griffin, 1979:303). The form of the telson is probably the clearest feature distinguishing it from the other three species: in *A. kyphosoma* the telson is slightly wider than long, and has a posteromedian spine; in *A. simsoni*, *A. sp. \alpha* (de Man 1928), and *A. trypeta*, the telson is distinctly broader than long, and lacks a posteromedian spine.

Distribution. Western Australia (North West Shelf (type locality)).

Genus *Wolffogebia* Sakai, 1982

Wolffogebia Sakai, 1982:75

Type species. *Wolffogebia pluketensis* Sakai, 1982, by original designation.

Diagnosis. Rostrum rounded, semicircular or truncate, not pointed at tip, ventral margin unarmed. Anterior region of carapace without spines medially, but thickly setose or with tufts of setae, with or without spines lateral, characteristically with distinct smooth median carina. Anterolateral margin of carapace unarmed. Lateral crest well

produced or reduced anteriorly, flanked on each side by furrow. Cervical groove distinct, unarmed on posterior margin. Linea thalassinica extending continuously or discontinuously along whole length of posterior carapace or anterior half only. Abdomen depressed, segment 6 broader than long. Telson slightly wider than long, posterior margin almost straight or weakly concave. Pereopod 1 subchelate. Pereopods 2-4 simple, pereopod 5 subchelate. Pleopod 1 absent in male, uniramous, biarticulate in female. Pleopods 2-5 biramous, without appendices internae. Uropod broad; exopod longer than endopod.

Species included. *Wolffogebia pluketensis* Sakai, 1982 (type species); *W. obtifrons* Sakai, 1982; *W. inermis* Sakai, 1982.

Remarks. The definition of the present genus was revised by re-examining the paratype specimen (Zoological Museum, Copenhagen) of the type species *Wolffogebia pluketensis* Sakai, 1982. The holotype was unfortunately not accessible to the author.

Wolffogebia inermis Sakai, 1982

(Figs 12-14)

Material. NTM Cr.000796, one ovig. female, TL 30.0, CL including rostrum 8.0, Ludmilla Creek, Darwin, NT, 15 September 1981, coll. J. Hooper. NTM Cr.001995, one male, TL 23.0, CL 6.2, without pereopods 1, East Arm of Darwin Harbour, Darwin, NT, 12°29.11'S 130°54.3'E, 11 September 1984, coll. R. Williams.

Diagnosis. Anterior portion of carapace hirsute except central longitudinal carina. Rostrum as long as broad, setose, unarmed; ventral surface with median carina, unarmed. Anterolateral margin of carapace unarmed. Lateral crest roundly produced anteriorly, unarmed. Linea thalassinica extending whole length of posterior portion of carapace. Telson subquadrate, slightly broader than long, posterior margin slightly concave, with median spine. Pereopod 1 subchelate; ventral meral margin unarmed, dorsal meral margin with one subterminal spine; distodorsal and distoventral carpal spine present; dorsal margin of propod with one subterminal spine; fixed finger short.

Description of female. Anterior region of carapace about 1.8 times as long as posterior region. Cervical groove entire, unarmed laterally. Rostrum as long as broad, hirsute, unarmed, lateral margins converging to obtuse tip (Fig.

12A); ventral surface carinate medially, without spines (Fig. 12B). Posterior to rostrum, dorsal surface of carapace hirsute except in midline and along cervical groove. Lateral crest hirsute, without spines, anteriorly produced into obtuse tip. Posterior region of carapace with setose band posterior to cervical groove. Anterolateral margin unarmed. Epistome with single terminal spine.

Telson (Fig. 12C) subquadrate, smaller than abdominal somite 6; lateral margins slightly expanded proximally, converging posteriorly; posterior margin slightly concave, with median spine.

Antennular peduncle without spine, extending beyond proximal margin of terminal segment of antenna; flagella short, 0.66 length of peduncle. Antennal peduncle without spines; scaphognathite absent. Maxilliped 1 (Fig. 13A) with endopod extending to distal margin of medial border of exopod; flagellum of exopod slender, two-segmented. Maxilliped 2 (Fig. 13B) with exopod uniramous, leaf-like, extending beyond distal margin of merus. Maxilliped 3 (Fig. 13C) without spines; exopod with flagellum two-segmented.

Pereopod 1 subchelate. Coxa and basis unarmed. Ischium with subterminal spine on ventral margin. Merus (Fig. 14A) 2.4 times as long as wide; ventral margin with sharp proximal spine, dorsal margin with sharp subterminal spine. Carpus 0.6 times as long as merus; dorsal and ventral margins with sharp subterminal spine. Propod 1.7 times as long as carpus, three times as long as wide; dorsal margin with strong subterminal spine; ventral margin with subterminal triangular fixed finger; fixed finger with tubercle on widely expanded distal margin (Fig. 14B). Dactyl 0.7 times as long as propod; dorsal margin carinate in proximal half, bordered with setae along lateral and mesial sides; lateral surface smooth on dorsal half, setose on ventral half.

Pereopod 2 with coxa, basis, and ischium unarmed. Merus (Fig. 14C) with proximal spine on ventral margin, with subterminal spine on dorsal margin. Carpus 0.6 times as long as merus, dorsal margin with subterminal spine. Propod shorter than carpus; lateral surface setose except on ventral half. Dactyl about as long as propod; lateral surface setose except medially.

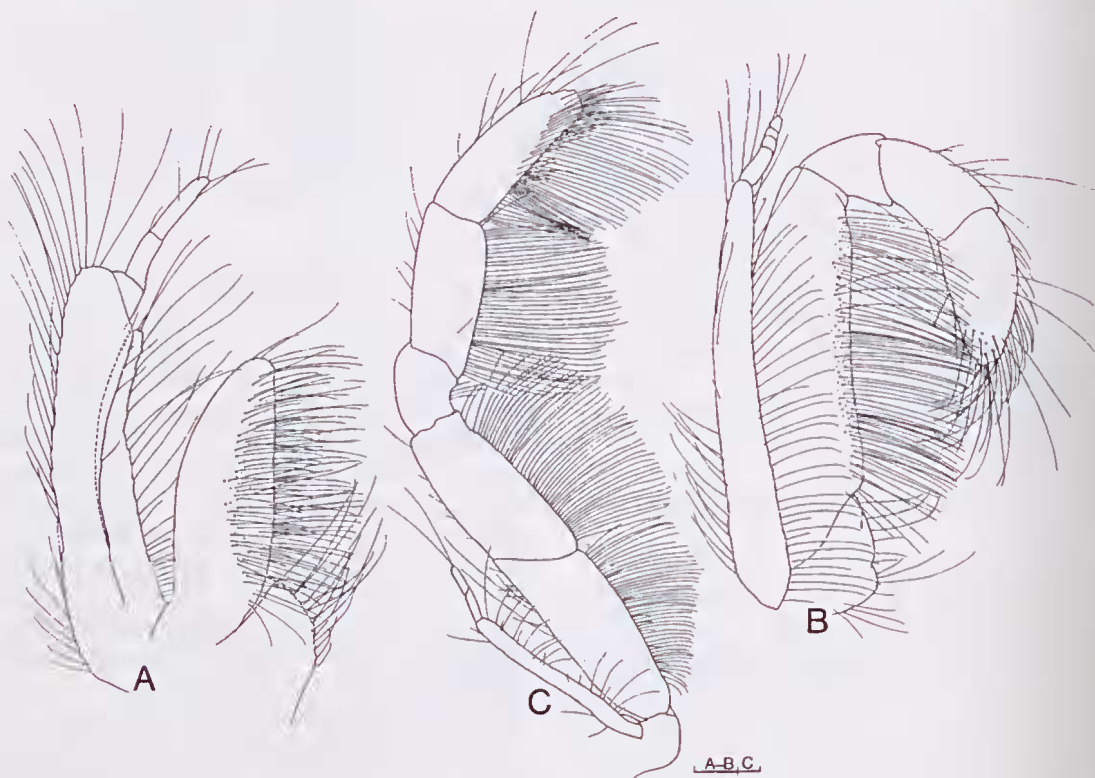


Fig. 13. *Wolffogebia inermis* Sakai, 1982. A-C, maxillipeds 1-3, lateral views. A-C, ovig. female, NTM Cr.000706. Scale in 1 mm divisions.

Pereopods 3-5 as shown in figures (Fig. 14D-F).

Pleopod 1 uniramous and two-segmented. Pleopods 2-5 biramous; exopods foliaceous in larger specimens, endopods small, 0.5 exopod length. Eggs 1 mm in diameter.

Uropodal exopod 1.2 times as long as wide, distinctly exceeding endopod and telson. Uropodal endopod triangular, about as long as telson; posterior margin 1.2 times as wide as long.

Remarks. This is the first record of *Wolffogebia inermis* from Australia.

Distribution. Indonesia (Tangerang (type locality), W. Jakarta); Australia (Port Darwin).

ACKNOWLEDGEMENTS

The specimens described in this report were kindly provided by Dr A.J. Bruce and Ms Karen

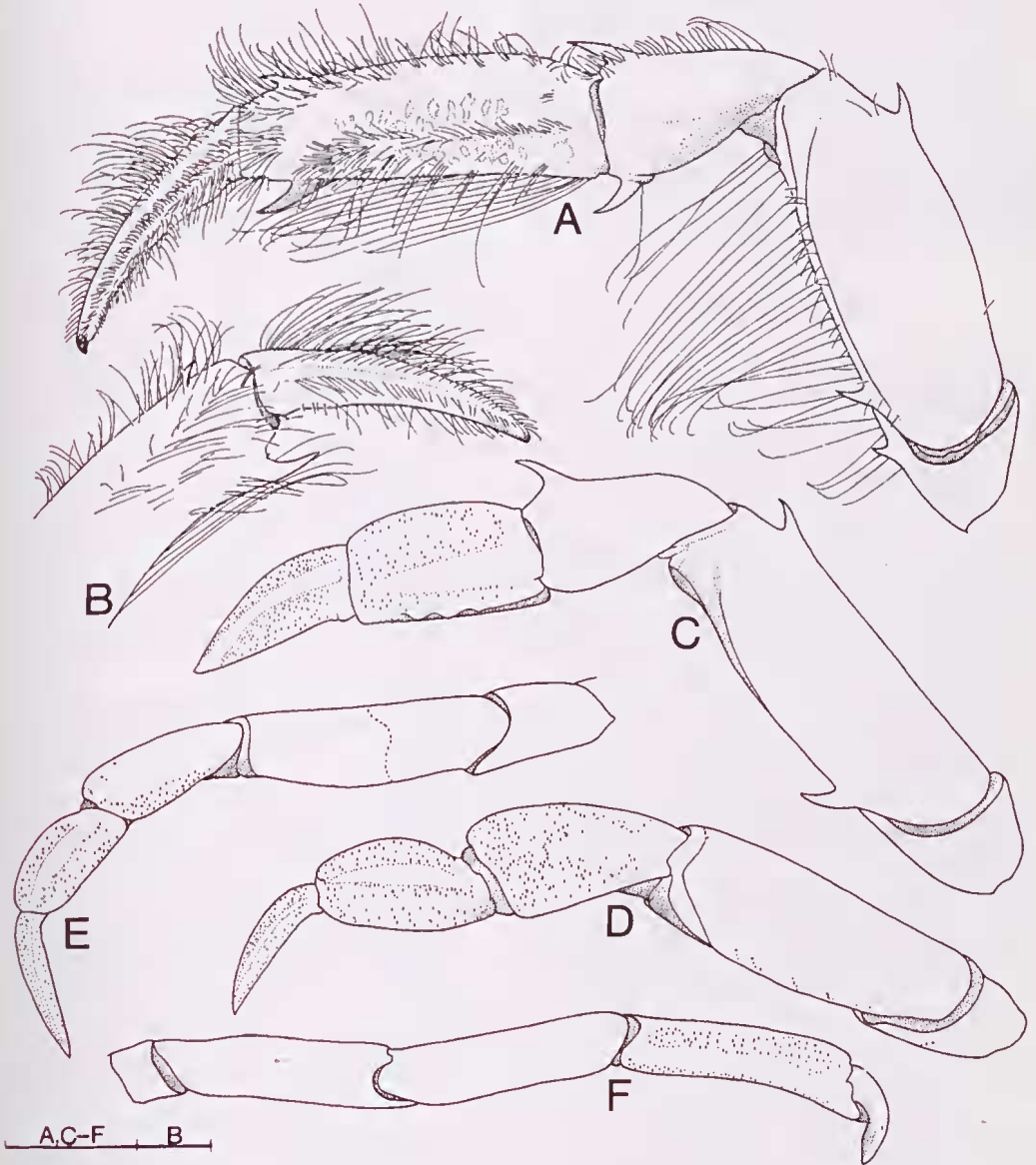


Fig. 14. *Wolffogebia inermis* Sakai, 1982. A, pereopod 1, lateral view; B, distal part of propod and dactyl, medial view; C-F, pereopods 2-5, lateral views, setae omitted. A-F, ovig. female, NTM Cr.000796. Scale in 1 mm divisions.

Coombes of the Northern Territory Museum and Ms Margot Sachse and Mr Darryl Grey of the Fisheries Division, Department of Primary Industry and Fisheries, Northern Territory. I am also obliged to Dr Gary C.B. Poore of the Museum of Victoria, Australia, who kindly provided the type specimens of *U. niugini* for comparison with the present species, Mr Paul Clark of The Natural History Museum, London, Dr. Torben Wolff, Zoology Museum, Copenhagen who allowed me to study the type specimens of *U. acutispina*, *A. danai* and *W. phuketensis*, Dr N. Ngoc-Ho of the Muséum National d'Histoire Naturelle, for her observations on variation in *Gebiacantha priochea*.

I wish to thank Dr A. J. Bruce of Darwin, Dr. H.K. Larson and Dr Michael Türkay of Senckenberg Museum, Frankfurt am Main, for their kind criticisms and comments on a previous draft of this manuscript.

REFERENCES

- Borradaile, L.A. 1903. On the classification of the Thalassinidea. *Annals and Magazine of Natural History Series 7*, 12: 534-551, 638.
- Bouvier, E.-L. 1915. Thalassinidés nouveaux capturés au large des côtes soudanaises par le *Talisman*. *Bulletin du Muséum National d'Histoire Naturelle, Paris* 21(6): 182-185.
- Bozic, B. and Saint Laurent, M. de 1972. Description et position systématique d'*Upogebia contigua* sp. nov. du golfe de Guinée (Crustacea Decapoda Callianassidae). *Bulletin du Muséum National d'Histoire Naturelle, Paris*, 3e sér. (35), Zoologie, 29: 339-346.
- Hale, H.M. 1941. Decapod Crustacea. *Reports on the B.A.N.Z. Antarctic Research Expedition, 1929-1931, Series B*, 4(9): 257-285.
- Haswell, W.A. 1882. Descriptions of some new species of Australian Decapoda. *Proceedings of the Linnean Society of New South Wales* 6: 750-763.
- Leach, W.E. 1814. Crustaceology. In: *Edinburgh Encyclopaedia* 7: 387-437.
- Man, J.G. de 1905. Diagnoses of new species of macrurous decapod Crustacea from the Siboga Expedition. *Tijdschrift der Nederlandse dierkundige vereniging, Leiden*, Ser. 2, 9(3and4): 587-614.
- Man, J.G. de. 1927. A contribution to the knowledge of twenty-one species of the genus *Upogebia* Leach. *Capita Zoologica* 2(5): 1-58.
- Man, J.G. de. 1928. The Decapoda of the Siboga-Expedition 7. The Thalassinidae and Callianassidae collected by the Siboga Expedition with some remarks on the Laomediidae. *Siboga Expeditie* 39a(6): 1-187.
- Miers, E.J. 1876. Descriptions of some new species of Crustacea, chiefly from New Zealand. *Annals and Magazine of Natural History Series 4*, 17: 218-229.
- Miers, E.J. 1884. Crustacea. In: *Report on the Zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. "Alert" 1881-1. British Museum, London*, pp 178-322, 513-575.
- Montague, G. 1808. Description of several marine animals found on the south coasts of Devonshire. *Transactions of the Linnean Society of London* 9: 81-114.
- Ngoc-Ho, N. 1989. Sur le genre *Gebiacantha* gen. nov., avec la description de cinq espèces nouvelles (Crustacea, Thalassinidea, Upogebiidae). *Bulletin du Muséum National d'Histoire Naturelle, Paris, Section A*, No. 1: 117-145.
- Ngoc-Ho, N. 1990. Nine Indo-Pacific species of *Upogebia* Leach (Crustacea: Thalassinidea: Upogebiidae). *Journal of Natural History* 24: 965-985.
- Nobili, G. 1904. Diagnoses préliminaires de vingt-huit espèces nouvelles de Stomatopodes et Décapodes Macroures de la mer Rouge. *Bulletin du Muséum National d'Histoire Naturelle, Paris* 10: 228-237.
- Ortmann, A.E. 1894. Crustaceen. In: Semon, R. (ed.), *Zoologische Forschungsreisen in Australien und dem Malayischen Archipel. Denkschriften der medizinisch-naturwissenschaftlichen Gesellschaft zu Jena* 8: 3-80.
- Poore, G.C.B. 1982. *Upogebia niugini* (Crustacea) a new shrimp from Papua New Guinea. *Proceedings of the Royal Society of Victoria* 94(4): 169-172.
- Poore, G.C.B. and Griffin, D.J. 1979. The Thalassinidea (Crustacea: Decapoda) of Australia. *Records of the Australian Museum* 32(6): 217-321.
- Saint Laurent, M. de and Ngoc-Ho, N. 1979. Description de deux espèces nouvelles du genre *Upogebia* Leach, 1814 (Decapoda, Upogebiidae). *Crustaceana* 37(1): 57-70.
- Sakai, K. 1967. Three new species of Thalassinidea (Decapod Crustacea) from South-West Japan. *Publications of the Seto Marine Biological Laboratory* 15(4): 319-328.
- Sakai, K. 1970. A new coral burrower, *Upogebia trypeta* sp. nov. collected from Amami-Oshima, Japan. *Publications of Seto Marine Biological Laboratory* 18: 49-56.
- Sakai, K. 1982. Revision of Upogebiidae (Decapoda, Thalassinidea) in the Indo-West Pacific Region. *Researches on Crustacea, Tokyo Special number* (1): 1-106.

- Sakai, K. 1984a. Some Upogebiidae (Crustacea, Decapods) in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden. *Zoologische Mededelingen* **58**(10): 149-162.
- Sakai, K. 1984b. Some Thalassinideans (Decapoda: Crustacea) from Heron Island, Queensland, eastern Australia, and a new species of *Gourretia* from East Africa. *The Beagle, Occasional Papers of the Northern Territory Museum of Arts and Sciences* **1**(11): 95-108.
- Sakai, K. 1986. On *Upogebia naruensis*, a new Thalassinid (Decapoda, Crustacea) from Japan. *Researches on Crustacea* **15**: 23-28.
- Stimpson, W. 1860. Prodrömus descriptionis animalium evertibratorum, quae in expeditione ad Oceanum Pacificum Septentrionalem, e Republica federata missa, C. Ringgold et J. Rodgers ducibus, observavit et descripsit. VIII Crustacea Macrura. *Proceedings of the Academy of Natural Sciences of Philadelphia* **1860**: 22-47.
- Tirmizi, N.M. and Kazmi, Q.B. 1979. Results of the study of the type of material of some species of *Upogebia* (Decapoda, Thalassinidea). *Crustaceana* Suppl. **5**: 105-114.
- Thomson, G.M. 1893. Notes on Tasmanian Crustacea, with descriptions of new species. *Papers and Proceedings of the Royal Society of Tasmania* **1892**: 45-76.
- Yu, C.S. 1931. On some species of shrimp-shaped Anomura from North China. *Bulletin of the Fan Memorial Institute of Biology* **2**(6): 85-96.

*) The name of Shikoku Womens's University was changed to Shikoku University on 1 April 1992.

Accepted 27 May 1992

